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For related information see also *Astronautics*.

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Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **2678**
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **2679**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **N.A.**

89 ASTRONOMY **2679**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **2679**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **N.A.**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **2680**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **2681**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

GENERAL

99 GENERAL **2681**

Note: N.A. means that no abstracts were assigned to this category for this issue.

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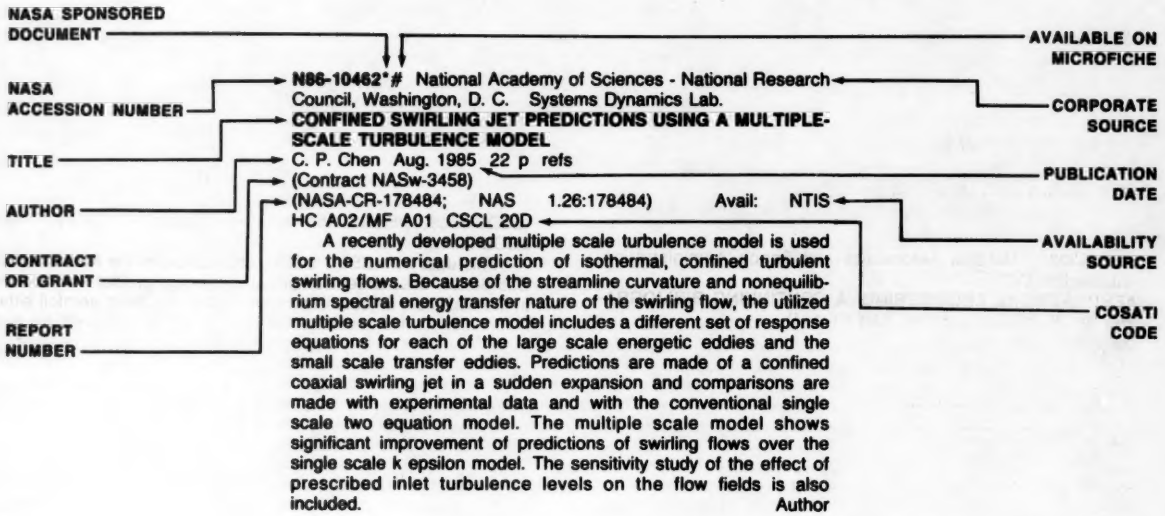
TYPICAL CITATION AND ABSTRACT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NASA ACCESSION NUMBER
N86-10462*# National Academy of Sciences - National Research Council, Washington, D. C. Systems Dynamics Lab.
CORPORATE SOURCE
TITLE
CONFINED SWIRLING JET PREDICTIONS USING A MULTIPLE-SCALE TURBULENCE MODEL
AUTHOR
C. P. Chen Aug. 1985 22 p refs
PUBLICATION DATE
CONTRACT OR GRANT
(Contract NASw-3458)
REPORT NUMBER
(NASA-CR-178484; NAS 1.26:178484) Avail: NTIS
AVAILABILITY SOURCE
HC A02/MF A01 CSCL 20D
COSATI CODE
A recently developed multiple scale turbulence model is used for the numerical prediction of isothermal, confined turbulent swirling flows. Because of the streamline curvature and nonequilibrium spectral energy transfer nature of the swirling flow, the utilized multiple scale turbulence model includes a different set of response equations for each of the large scale energetic eddies and the small scale transfer eddies. Predictions are made of a confined coaxial swirling jet in a sudden expansion and comparisons are made with experimental data and with the conventional single scale two equation model. The multiple scale model shows significant improvement of predictions of swirling flows over the single scale k epsilon model. The sensitivity study of the effect of prescribed inlet turbulence levels on the flow fields is also included.
Author

VOLUME 24 NUMBER 16 / AUGUST 23, 1986

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N86-25322* National Aeronautics and Space Administration, Washington, D.C.
AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 194)
Dec. 1985 108 p
(NASA-SP-7037(194); NAS 1.21:7037(194)) Avail: NTIS HC A06 CSCL 01A

This bibliography lists 369 reports, articles and other documents introduced into the NASA scientific and technical information system in November 1985. Author

N86-25323* National Aeronautics and Space Administration, Washington, D.C.
AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 200)
1986 136 p
(NASA-SP-7037(200); NAS 1.21:7037(200)) Avail: NTIS HC A07 CSCL 01A

This bibliography lists 484 reports, articles, and other documents introduced into the NASA scientific and technical information system in April 1986. Author

N86-25324# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE CURRENT SITUATION OF THE CAAC (CIVIL AVIATION ADMINISTRATION OF CHINA)
14 Jan. 1986 10 p refs Transl. into ENGLISH from Hangkong Zhishi (China), no. 1, Jan. 1985 p 11-12
(AD-A164464; FTD-ID(RS)T-0946-85) Avail: NTIS HC A02/MF A01 CSCL 01/2

This reprinted article discusses the Civil Aviation of China (CAAC)--its equipment and service. After diplomatic relations were restored with the U.S., CAAC began buying Boeing - 737s and 747s. This improved service CAAC flew to more places, served better meals and quit buying planes from Russia and quit renting planes from Pakistan. The CAAC controls all Chinese commercial airlines from purchasing planes to managing runways and airport buildings. They fly 3.8 million passengers a year, employ 50, 000 people and own 500 airplanes. This is large even compared to U.S. standards. GRA

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N86-25325 ESDU International Ltd., London (England).
INCREMENTS IN AEROFOIL MAXIMUM LIFT COEFFICIENT DUE TO DEPLOYMENT OF VARIOUS HIGH-LIFT DEVICES
Dec. 1985 36 p refs
(ESDU-85033; ISBN-0-85679-539-9; ISSN-0141-397X) Avail: ESDU

This data item ESDU 85033, an addition to the Aerodynamics Sub-Series, uses a semi-empirical method to predict the increase in the maximum lift coefficient from that of the basic aerofoil either estimated by the method of ESDU 84026 or obtained by test. Devices considered are plain leading-edge flaps, slats, Krueger flaps with or without vents, and plain and split trailing-edge flaps. The method applies to low speed flow for a practical range of Reynolds number and geometries, and also yields the zero lift incidence with the devices deployed. Comparison of prediction with test is made, and standard deviations are tabulated for each type of device. The overall accuracy for all devices over 141 experimental points is a standard deviation of 0.018 in maximum lift coefficient. Author

N86-25326# Sandia National Labs., Albuquerque, N. Mex.
EXPERIMENTAL STUDY OF THE PERFORMANCE OF CLUSTERED PARACHUTES IN A LOW-SPEED WIND TUNNEL
B. K. Baca Dec. 1985 39 p
(Contract DE-AC04-76DP-00789)
(DE86-004977; SAND-85-0813) Avail: NTIS HC A03/MF A01

Recent interest in clusters of parachutes prompted a review of cluster drag data and inflation characteristics. This examination indicated that very little well-documented data exist that are suitable for broad applications. A low-speed wind-tunnel test program was devised to measure the effects of variations in four important parameters on the terminal drag and stability of clusters of parachutes. The parameters studied were canopy number, canopy type, riser length, and reefing. Efforts were made to account for effects stemming from the experiment's design, especially wind-tunnel blockage. Many of the results of the wind-tunnel tests were validated by a series of drop tests. Terminal drag and stability data are presented here along with proposed explanations for observed phenomena. DOE

N86-25327*# Mississippi Univ., University.
RADIATIVE COUPLED NONEQUILIBRIUM FLOW FIELDS ASSOCIATED WITH AEROASSISTED ORBITAL TRANSFER Final Contractors Report, Jul. 1984 - Mar. 1986
T. E. Horton 1986 36 p refs
(Grant NAG1-496)
(NASA-CR-176790; NAS 1.26:176790) Avail: NTIS HC A03/MF A01 CSCL 01A

Development of an algorithm which will allow nonequilibrium flow field codes to be coupled to radiative transfer codes (currently limited to equilibrium applications) was initiated. The algorithm consists of an equation for the prediction of electronic state population fractions (electronic state temperature) and equations for the computation of spectral absorption coefficients and source functions. These expressions represent a thorough treatment in

the context of the bandless model which in the past has proven adequate for equilibrium radiative transfer predictions. Perhaps the approach is more than adequate as the current algorithm requires four temperatures for each transition. Clearly, a more sophisticated model can be developed; however, it would require more information, such as rotational temperatures of the electronic levels. B.G.

N86-25328*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
TRANSONIC AIRFOIL ANALYSIS AND DESIGN IN NONUNIFORM FLOW
Jen-Fu Chang and C. Edward Lan Washington NASA Jun. 1986 84 p refs
(Grant NAG1-308)
(NASA-CR-3991; NAS 1.26:3991; CRINC-FRL-602-2) Avail: NTIS HC A05/MF A01 CSCL 01A

A nonuniform transonic airfoil code is developed for applications in analysis, inverse design and direct optimization involving an airfoil immersed in propfan slipstream. Problems concerning the numerical stability, convergence, divergence and solution oscillations are discussed. The code is validated by comparing with some known results in incompressible flow. A parametric investigation indicates that the airfoil lift-drag ratio can be increased by decreasing the thickness ratio. A better performance can be achieved if the airfoil is located below the slipstream center. Airfoil characteristics designed by the inverse method and a direct optimization are compared. The airfoil designed with the method of direct optimization exhibits better characteristics and achieves a gain of 22 percent in lift-drag ratio with a reduction of 4 percent in thickness. Author

N86-25329# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
PITCH-LOCATION EFFECTS ON DYNAMIC STALL M.S. Thesis
Robert L. Dimmick Dec. 1985 188 p refs
(AD-A164322; AFIT/GAE/AA/85D-4) Avail: NTIS HC A09/MF A01 CSCL 20/4

Experimental investigations were conducted in the AFIT Smoke Tunnel to study the effects of pitch-location on dynamic stall. A NACA 0015 airfoil was rotated about four different locations at a constant angular rate and digital position and pressure information were recorded. This information was then converted into airfoil pressure distributions and integrated numerically to obtain airfoil force coefficients. Results of this investigation showed a direct relationship between the dynamic-stall angle of attack and the non-dimensionalized angular rotation rate, ND, defined as one-half the airfoil chord length times the angular rate divided by the freestream velocity. Based on the rotation points forward of the mid-chord, it was also shown that dynamic stall is delayed as the pitch location is moved aft from the leading edge. Experimental data was obtained for pitch locations of .08c, .25c, .50c and .61c and non-dimensional angular rates between .011 and .065. GRA

N86-25330# Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
ESTIMATING WATER VAPOR CONDENSATION EFFECTS FOR TRANSONIC AND SUPERSONIC FLOW FIELDS Final Report, 1 Oct. 1982 - 31 Aug. 1985
C. E. Robinson and R. C. Bauer Dec. 1985 37 p Sponsored by AEDC, AFS, Tenn. Prepared in cooperation with Calspan Field Services, Inc., Arnold AFS, Tenn.
(AD-A163146; AEDC-TR-85-63) Avail: NTIS HC A03/MF A01 CSCL 20/4

A computer code was developed which estimates the effect of water vapor condensation in two- and three-dimensional flow fields using the Euler equations. The program computes the effect by including the energy release due to condensation in the energy equation. In this manner, the local effect of condensation is included in the calculation of the flow-field properties. A species equation for the conservation of water vapor is also included, as well as an empirical method of predicting the onset of condensation. To evaluate the versatility of the code, calculations of the transonic flow field about a two-dimensional airfoil, a cone at angle of attack, and the flow in planar, two-dimensional and axisymmetric supersonic nozzles have been made for discrete values of specific humidity. In general, the effects of local condensation and revaporization estimated by the code are in good agreement with the experiment data found in the literature. GRA

N86-25531# Joint Publications Research Service, Arlington, Va.
EFFECT OF DIRECTIONAL INJECTION AND SUCTION ON CHARACTERISTICS OF LAMINAR BOUNDARY LAYER WITH NEGATIVE PRESSURE GRADIENT Abstract Only
M. N. Kiselev, V. P. Motulevich, and E. D. Sergiyevskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 75-76 refs Transl. into ENGLISH from Izv. Sibirskogo Otd. Akad. Nauk SSSR: Ser. Tekh. Nauk (USSR), no.4, iss.1, Mar. 1985 p 94098 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

N86-25532# Joint Publications Research Service, Arlington, Va.
WAVE DRAG OF SOLIDS OF REVOLUTION WITH FRONTAL SEPARATION ZONE IN SUPERSONIC STREAM Abstract Only
I. A. Belov, S. A. Isayev, A. Yu. Mitin, and V. N. Konovalov *In its* USSR Report: Engineering Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 77-78 refs Transl. into ENGLISH from Izv. Sibirskogo Otd. Akad. Nauk SSSR: Ser. Tekh. Nauk (USSR), no. 4, iss. 1, Mar. 1985 p 47-51 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

N86-25533# Joint Publications Research Service, Arlington, Va.
TRANSIENT AERODYNAMIC CHARACTERISTICS OF FOIL IN STREAM WITH SEPARATION FLOW NEAR WAVY WALL Abstract Only
L. V. Mikhaylova *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 78 refs Transl. into ENGLISH from Izv. Sibirskogo Otd. Akad. Nauk SSSR: Ser. Tekh. Nauk, no. 4, iss. 1, Mar. 1985 p 56-60 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

N86-25534# Joint Publications Research Service, Arlington, Va.
HYPERSONIC FLOW AROUND A WING AT LARGE ANGLES OF ATTACK WITH DETACHED COMPRESSION JUMP Abstract Only
V. N. Golubkin and V. V. Negoda *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 87 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhanika Zhidosti i Gaza (USSR), no. 3, May-Jun. 1985 p 149-157 Original language document was announced in IAA as A85-44788 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

N86-25536# Joint Publications Research Service, Arlington, Va.
SPECIFICS OF FLOW NEAR STAGNATION POINT WITH SUPERSONIC FLOW AROUND EXPONENTIALLY SHAPED BODIES Abstract Only
V. N. Karlovskiy and V. A. Levin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 88 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhanika Zhidoti i Gaza (USSR), no. 3, May-Jun. 1985 p. 138-142 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

N86-25537# Joint Publications Research Service, Arlington, Va.
STABILITY OF SUBSONIC BOUNDARY LAYER UPON HEATING OF A SURFACE OF A FLAT PLATE NEAR THE LEADING EDGE Abstract Only
A. V. Kazakov, M. N. Kogan, and V. A. Kuparev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 89 Transl. into ENGLISH from Izvesitya Akademii Nauk SSSR: Mekhanika Zhidkosti i Gaza (Moscow, USSR), no. 3, May - Jun. 1985 p 68-72 Original language document was announced

in IAA as A85-44783 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

N86-25538# Joint Publications Research Service, Arlington, Va.
INCREASED STABILITY OF SUBSONIC BOUNDARY LAYER DURING HEATING OF SURFACE NEAR LEADING EDGE OF BODY IMMERSED IN STREAM Abstract Only
A. V. Kazakov, M. N. Kogan, and V. A. Kuparev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 91 Transl. into ENGLISH from Doklady Akademii Nauk SSSR (Moscow, USSR), v. 283, no. 2, Jul. 1985 p 333-335 Original language document was announced in IAA as A85-46029 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

N86-25551# Joint Publications Research Service, Arlington, Va.
ACID RAIN, OTHER FACTORS STUDIED IN DESTRUCTION OF PINE FORESTS
Shuwen Yu, Ziwen Yu, Houtian Liu, Jianmin Shu, Guangjing Ma, and Xiangyan Zhu *In its* China Report: Science and Technology (JPRS-CST-86-011) 31 Mar. 1986 p 92-98 refs Transl. into ENGLISH from Huanjing Kexue (Beijing, China), v. 6, no. 5, 30 Oct. 1985 p 63-66 (For primary document see N86-25547 16-31)
Avail: NTIS HC A07/MF A01

N86-25552# Joint Publications Research Service, Arlington, Va.
NUMERICAL PREDICTION OF SUPERSONIC BOUNDARY-LAYER TRANSITION Abstract Only
Guanghua Zhang and Hui Yang *In its* China Report: Science and Technology (JPRS-CST-86-011) 31 Mar. 1986 p 99 Transl. into ENGLISH from Kongqidongliuxe Xuebao (Mianyang, China), no. 4, 1985 p 9-18 (For primary document see N86-25547 16-31)
Avail: NTIS HC A07/MF A01

N86-25554# Joint Publications Research Service, Arlington, Va.
KERNEL FUNCTION METHOD FOR UNSTEADY TRANSONIC FLOW PAST LOW-FREQUENCY OSCILLATING BODIES OF REVOLUTION Abstract Only
Jianyu Cheng and Lixian Zhuang *In its* China Report: Science and Technology (JPRS-CST-86-011) 31 Mar. 1986 p 101 Transl. into ENGLISH from Kongqidonglixue Xuebao (Mianyang, China), no. 4, 1985 p 45-54 (For primary document see N86-25547 16-31)
Avail: NTIS HC A07/MF A01

N86-25558# Joint Publications Research Service, Arlington, Va.
SUPERSONIC FLOW AROUND BLUNT PERFORATED SHIELDS Abstract Only
S. V. Guvernyuk, K. G. Savinov, and G. S. Ulyanov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 2 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Zhidkosti i Gaza (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 143-149 Original language document was announced in IAA as A85-28442 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25559# Joint Publications Research Service, Arlington, Va.
AERODYNAMIC INDUCTANCE OF SUBSONIC WIND TUNNELS WITH AXISYMMETRIC TEST ZONE Abstract Only
O. Yu. Starikov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 3 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Zhidkosti i Gaza (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 150-154 Original language document was announced in IAA as A85-28443 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25560# Joint Publications Research Service, Arlington, Va.
FLOW AROUND DELTA WINGS WITH BROKEN-LINE LEADING EDGES Abstract Only
A. I. Shvets *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 3 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Zhidkosti i Gaza (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 171-175 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25562# Joint Publications Research Service, Arlington, Va.
MOVEMENT OF FLEXIBLE WING AT SUPERSONIC VELOCITY UNDER INFLUENCE OF RANDOM GUST Abstract Only
B. A. Yershov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 4-5 Transl. into ENGLISH from Vestnik Leningradskogo Universiteta: Matematika, Mekhanika, Astronomiya (Leningrad, USSR), no. 1, Jan. - Mar. 1985 p 59-63 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25565# Joint Publications Research Service, Arlington, Va.
SEMICONDUCTOR TEMPERATURE AND STRAIN GAUGES Abstract Only
M. T. Gorbachuk, V. V. Mitin, Yu. M. Shvarts, and Yu. A. Tkhorik *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 40 Transl. into ENGLISH from Pribory i Sistemy Upravleniya (Moscow, USSR), no. 9, Sep. 1984 p 21-22 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N86-25331# Lockheed-California Co., Burbank.
KRASH DYNAMICS ANALYSIS MODELING: TRANSPORT AIRPLANE CONTROLLED IMPACT DEMONSTRATION TEST Final Report, Jan. 1984 - Sep. 1984
Gil Wittlin and Bill LaBarge Mar. 1986 178 p refs Revised (Contract DTFA03-84-C-00004)
(DOT/FAA/CT-85/9-Rev; LR-30776-Rev) Avail: NTIS HC A09/MF A01

A transport airplane Controlled Impact Demonstration (CID) test is analyzed with program KRASH. Prior to modeling the test conditions, supporting analysis of both narrow-body and wide-body transport airplane frame segments were modeled with KRASH and compared to existing test results. The results of the analysis are utilized as input data for the KRASH CID model. Prior to the CID test a narrow-body transport airplane was impacted with the ground, via a free fall drop, to obtain structure crush and damage data. The KRASH modeling of this test was used to refine the CID KRASH model. The CID KRASH model is exercised to obtain anticipated floor acceleration, underside crush, fuselage forces, and deflections. All KRASH modeling is performed utilizing current enhancement features. Recent KRASH85 coding changes; KRASH models and results for both narrow-body and wide-body transport airplane frame section drop tests; KRASH model and results for a narrow-body airplane drop test; KRASH model and results for a CID test; and conclusions based on the CID pre-test analysis results are presented. Author

N86-25332# National Transportation Safety Board, Washington, D. C. Bureau of Accident Investigation.
AIRCRAFT ACCIDENT REPORT: AIR CANADA FLIGHT 797, MCDONNELL DOUGLAS DC-9-32, C-FTLU, GREATER CINCINNATI INTERNATIONAL AIRPORT, COVINGTON, KENTUCKY, JUNE 2, 1983
31 Jan. 1986 118 p
(PB86-910402; NTSB-AAR-86-02) Avail: NTIS MF A01; also available on subscription, North American Continent price HC $60.00/year; all others write for quote CSCL 01B

On June 2, 1983, Air Canada Flight 797, a McDonnell Douglas DC-9-32, of Canadian Registry C-FTLU, was a regularly scheduled international passenger flight from Dallas, Texas, to Montreal, Quebec, Canada, with an en route stop at Toronto, Canada. The flight left Dallas with 5 crewmembers and

41 passengers on board. About 1903, eastern daylight time, while en route at flight level 330, the cabin crew discovered a fire in the aft lavatory. After contacting air traffic control (ATC) and declaring an emergency, the crew made an emergency descent, and ATC vectored Flight 797 to the Greater Cincinnati International Airport, Covington, Kentucky. At 1920.09, eastern daylight time, Flight 797 landed on runway 27L at the Greater Cincinnati International Airport. As the pilot stopped the airplane, the airport fire department was in place and began firefighting operations. 23 passengers were not able to get out of the plane and died in the fire. The airplane was destroyed. GRA

N86-25333# National Transportation Safety Board, Washington, D. C. Bureau of Accident Investigation.
AIRCRAFT ACCIDENT/INCIDENT SUMMARY REPORTS: CONCORD, CALIFORNIA, JULY 14, 1984; ATLANTA, GEORGIA, SEPTEMBER 24, 1984; JASPER, ALABAMA, DECEMBER 16, 1984; AVALON, CALIFORNIA, JANUARY 30, 1984; CHARLOTTESVILLE, VIRGINIA, FEBRUARY 17, 1984; KANSAS CITY, KANSAS, JANUARY 9, 1985
31 Dec. 1985 46 p
(PB86-910410; NTSB-AAR-85-02-SUM) Avail: NTIS MF A01; also available on subscription, North American Continent price HC $60.00/year; all others write for quote CSCL 01B

The publication is a compilation of the reports of six separate aircraft accidents investigated by the National Transportation Safety Board. The accident locations and their dates are as follows: Concord, California, July 14, 1984; Atlanta, Georgia, September 24, 1984; Jasper, Alabama, December 16, 1984; Avalon, California, January 30, 1984; Charlottesville, Virginia, February 17, 1984; and Kansas City, Kansas, January 9, 1985. A Brief of Accident containing the probable cause is included for each case. GRA

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N86-25334# Massachusetts Inst. of Tech., Lexington.
PILOT EVALUATION OF TCAS IN THE LONG RANGER HELICOPTER
John W. Andrews 3 Jun. 1986 30 p refs Sponsored by Massachusetts Inst. of Tech., Lexington. Prepared in cooperation with Federal Aviation Administration,Washington, D.C.
(Contracts F19628-85-C-0002; DOT-FA77WAI-817)
(FAA/PM-85/30; ATC-136) Avail: NTIS HC A03/MF A01 CSCL 17G

A specially modified version of the Traffic Alert and Collision Avoidance System (TCAS) was installed in a Bell Long Ranger helicopter in order to investigate the feasibility of TCAS operation in rotorcraft. This installation employed TCAS air-to-air surveillance to provide automated traffic advisories that were displayed in the cockpit on a color cathode ray tube display. As part of this study, 12 subject pilots evaluated the utility of the installation through brief test flights in the vicinity of a major airport. Among the topics investigated were the rate of alarms, the computer logic for issuing advisories, the bearing accuracy, and the display symbology. Several recommendations for adapting TCAS to the rotorcraft environment resulted from the testing. Author

N86-25335*# Douglas Aircraft Co., Inc., Long Beach, Calif.
GUIDANCE STUDIES FOR CURVED, DESCENDING APPROACHES USING THE MICROWAVE LANDING SYSTEM (MLS)
J. B. Feather May 1986 90 p refs
(Contract NAS1-16202)
(NASA-CR-178030; NAS 1.26:178030) Avail: NTIS HC A05/MF A01 CSCL 17G

Results for the Microwave Landing System (MLS) guidance algorithm development conducted under the Advance Transport Operating System (ATOPS) Technology Studies (NAS1-16202) are documented. The study consisted of evaluating guidance law for vertical and lateral path control, as well as speed control, for approaches not possible with the present Instrument Landing System (ILS) equipment. Several specific approaches were simulated using the MD-80 aircraft simulation program, including curved, descending (segmented glide slope), and decelerating paths. Emphasis was placed on development of guidance algorithms specifically for approaches at Burbank, where proposed flight demonstrations are planned. Results of this simulation phase are suitable for use in future fixed base simulator evaluations employing actual hardware (autopilot and a performance management system). Author

N86-25336# Applied Science Analytics, Inc., Canoga Park, Calif.
ASTROGEODETIC-INERTIAL METHODS FOR VERTICAL DEFLECTION DETERMINATION Final Report, 28 Sep. 1984 - 28 Oct. 1985
Sam C. Bose Dec. 1985 57 p refs
(Contract DACA72-84-C-0017)
(AD-A164304; ASA-TR-85-7; ETL-0414) Avail: NTIS HC A04/MF A01 CSCL 17/7

Considerable progress has been made in inertial surveying by the Position and Azimuth Determining System (PADS). Following the installation of an improved vertical accelerometer and other modifications, the PADS has been renamed Inertial Positioning System (IPS). The IPS, with some software changes as to gyro error control has served as the Rapid Gravity Survey System (RGSS) for ETL. The present RGSS operates as a quasi-local level system and permits Kalman stochastic error control using observed velocity errors at vehicle stops. A new optimal data reduction method for estimating the deflections of the vertical is presented. The method requires RGSS horizontal velocity errors at each stop and the inertial system real-time Kalman filter update gains. Storage of real-time convariance data is not necessary. Survey traverse initial and terminal astrogeodetic deflections are utilized along with terminal platform azimuth error observation to estimate approximate gyro biases. The error models used preserve the inertial system dual horizontal interaction and exploits statistical collocation techniques to preserve correlations between the two components of the deflection of the vertical which are least squares estimated using all data simultaneously. GRA

N86-25337# Massachusetts Inst. of Tech., Cambridge. Sea Grant College Program.
WIDE BANDWIDTH POSITIONING SYSTEMS FOR SPACE AND UNDERWATER VEHICLES
H. Kazerooni and T. B. Sheridan Jun. 1985 20 p
(Grant NA84AA-D-00046)
(PB86-152394; MITSG-85-34) Avail: NTIS HC A02/MF A01 CSCL 17G

The report presents a method for wide bandwidth stiff position control of unmanned underwater and space vehicles. With feedback alone the vehicle may not behave like a stiff platform in the presence of a wide frequency range of disturbances. Given this limitation, the authors suggest that the vehicle must be connected to environmental structures by means of cables or grabbers. These connecting cables will develop dynamic and kinematic constraints on the vehicle motion. This problem led to the development of a method that allows for control of the motion of constrained underwater or space vehicles. This method is called impedance control. The authors explain how, with the help of this method, a vehicle connected to a structure by means of cables can be positioned with high stiffness while at the same time the cable tensions are also under control. Author (GRA)

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N86-25338 ESDU International Ltd., London (England). Engineering Sciences Data Unit.
CONVERSION OF AIR-DATA SYSTEM PRESSURE ERRORS INTO HEIGHT AND SPEED CORRECTIONS
Nov. 1985 37 p refs
(ESDU-85036; ISBN-0-85679-542-9; ISSN-0141-4054) Avail: ESDU

Approximate formulae for converting errors in pitot and static pressure into corrections to height, Mach number and indicated airspeed are presented as both equations and graphs. The methods give acceptable accuracy for constructing charts or tables of height and speed corrections for flight and operating manuals when pressure errors are not large. Exact methods for correcting speed and height are also included for use when the pressure errors are large, and guidance is included on the correction procedure under nonsteady conditions when any of the errors may depend on the height, Mach number or airspeed. A practical work example illustrates the use of the method. Author

N86-25339# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
EVALUATION OF A FREQUENCY RESPONSE TECHNIQUE FOR AIRCRAFT SYSTEM IDENTIFICATION M.S. Thesis Final Report, Feb. 1984 - Oct. 1985
Allan T. Reed 31 Oct. 1985 108 p refs
(AD-A164367; AFIT/GAE/AA/85J-2) Avail: NTIS HC A06/MF A01 CSCL 01/1

This paper presents the results of a project which used frequency analysis methods applied to flight test data in order to identify aircraft parameters. Computer programs were developed to generate simulated flight test data so the frequency response programs could be tested using a noise free data source. Once the simulated data programs were complete, the frequency response methods were developed. The frequency response method uses the cross-spectral density technique to generate magnitude and phase information. The program also generates the power spectral density functions. Noise contamination studies were made. The programs were used with the test project, HAVE DELAY, which was conducted at the USAF Test Pilot School. The frequency response program worked well up to a frequency of about 15 radians per second. Above 15 radians per second the programs suffer from additional noise and aliasing effects. Recommendations were made to study means of reducing noise effects to include anti-aliasing filters and noise processing schemes for digital data. GRA

N86-25340# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
MULTIVARIABLE OUTPUT CONTROL LAW DESIGN FOR THE STOL (SHORT TAKEOFF AND LANDING) F-15 IN LANDING CONFIGURATION M.S. Thesis
Bruce H. Acker Dec. 1985 294 p refs
(AD-A164516; AFIT/GE/ENG/85D-1) Avail: NTIS HC A13/MF A01 CSCL 01/2

Using the MULTI computer aided design and simulation program, multivariable, output feedback digital control laws are designed for the F-15 STOL aircraft in the landing configuration. The STOL F-15 landing configuration includes canards and reversible thrust in addition to conventional F-15 control surfaces. The additional controls allow decoupling of the output variables in the longitudinal plane. Longitudinal aircraft dynamics, derived from data provided by the prime contractor, McDonnell-Douglas, are presented in linearized state space form for the design procedure. Control laws are developed to stabilize the aircraft to perform longitudinal landing maneuvers (flight path control and flare) at six flight conditions. The design encompasses actuator dynamics, computational delay, sensor dynamics, sensor noise, and plant nonlinearities. Designs of two of the flight conditions are sufficiently insensitive to plant variations to be used at all but one of the remaining flight conditions. The technique of multivariable output feedback, with the MULTI program provides good robust designs for the STOL F-15. GRA

N86-25341# Aeronautical Research Labs., Melbourne (Australia).
REPORT ON INTEREST EXPRESSED IN SOME AUSTRALIAN DEFENCE ESTABLISHMENT PRODUCTS DISPLAYED AT THE 1985 PARIS AIR SHOW
U. R. Krieser Aug. 1985 29 p
(AD-A160807; ARL-AERO-PROP-TM-429; AR-004-040) Avail: NTIS HC A03/MF A01 CSCL 01/3

During June 1985 a number of aerospace products developed in Australia were displayed at the Paris Air Show. The Department of Defense was one of 16 exhibitors, and presented 14 products which it considered to have commercial potential on the world market. Considerable interest was shown in the Department of Defense products presented in Paris, and subsequent visits to aerospace companies in Israel, further demonstrated strong overseas interest in both manufacture and purchase of these products. Author

N86-25564# Joint Publications Research Service, Arlington, Va.
LIMITS OF HEAT TRANSFER INTENSIFICATION IN COMPACT HEAT EXCHANGERS Abstract Only
V. I. Subbotin, V. F. Gordeyev, V. V. Kharitonov, and A. A. Plakseyev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 25 Transl. into ENGLISH from Doklady Akademii Nauk SSSR (Moscow, USSR), v. 279, no. 4, Dec. 1984 p 888-891 Original language document was announced in IAA as A85-20092 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25601# Joint Publications Research Service, Arlington, Va.
INFORMATION ON NEW AN-124 GIANT CARGO PLANE Abstract Only
N. Dombkovskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 4 Transl. into ENGLISH from Trud (Leningrad, USSR), 23 May 1985 p 1 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25602# Joint Publications Research Service, Arlington, Va.
DATA ON MI-26 HELICOPTER Abstract Only
L. Chernov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 7-8 Transl. into ENGLISH from Kommunist (Moscow, USSR), 19 May 1985 p 4 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N86-25342*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
DIGITAL ELECTRONIC ENGINE CONTROL (DEEC) FLIGHT EVALUATION IN AN F-15 AIRPLANE
Mar. 1984 243 p refs Symposium held in Edwards, Calif., 25-26 May 1983
(NASA-CP-2298; H-1201; NAS 1.55:2298) Avail: NTIS HC A11/MF A01 CSCL 21E

Flight evaluation in an F-15 aircraft by digital electronic engine control (DEEC) was investigated. Topics discussed include: system description, F100 engine tests, effects of inlet distortion on static pressure probe, flight tests, digital electronic engine control fault detection and accommodation flight evaluation, flight evaluation of a hydromechanical backup control, augmentor transient capability of an F100 engine, investigation of nozzle instability, real time in flight thrust calculation, and control technology for future aircraft propulsion systems. It is shown that the DEEC system is a powerful and flexible controller for the F100 engine. For individual titles, see N86-25343 through N86-25356.

N86-25343*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
DIGITAL ELECTRONIC ENGINE CONTROL F-15 OVERVIEW
Berwin Kock *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane Mar. 1984 p 1-14 (For primary document see N86-25342 16-07)
(Paper-1) Avail: NTIS HC A11/MF A01 CSCL 21E

A flight test evaluation of the digital elctronic engine control (DEEC) system was conducted. An overview of the flight program is presented. The roles of the participating parties, the system, and the flight program objectives are described. The test program approach is discussed, and the engine performance benefits are summarized. A description of the follow-on programs is included. Author

N86-25344*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
DIGITAL ELECTRONIC ENGINE CONTROL HISTORY
Terrill W. Putnam *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane Mar. 1984 p 15-31 (For primary document see N86-25342 16-07)
(Paper-2) Avail: NTIS HC A11/MF A01 CSCL 21E

Full authority digital electronic engine controls (DEECs) were studied, developed, and ground tested because of projected benefits in operability, improved performance, reduced maintenance, improved reliability, and lower life cycle costs. The issues of operability and improved performance, however, are assessed in a flight test program. The DEEC on a F100 engine in an F-15 aircraft was demonstrated and evaluated. The events leading to the flight test program are chronicled and important management and technical results are identified. Author

N86-25345*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
F-15 DIGITAL ELECTRONIC ENGINE CONTROL SYSTEM DESCRIPTION
Lawrence P. Myers *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane Mar. 1984 p 33-53 (For primary document see N86-25342 16-07)
(Paper-3) Avail: NTIS HC A11/MF A01 CSCL 21E

A digital electronic engine control (DEEC) was developed for use on the F100-PW-100 turbofan engine. This control system has full authority control, capable of moving all the controlled variables over their full ranges. The digital computational electronics and fault detection and accomodation logic maintains safe engine operation. A hydromechanical backup control (BUC) is an integral part of the fuel metering unit and provides gas generator control at a reduced performance level in the event of an electronics failure. The DEEC's features, hardware, and major logic diagrams are described. Author

N86-25346*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
NASA LEWIS F100 ENGINE TESTING
Roger A. Werner, Ross G. Willoh, Jr., and Mahmood Abdelwahab *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane Mar. 1984 p 55-71 refs (For primary document see N86-25342 16-07)
(Paper-4) Avail: NTIS HC A11/MF A01 CSCL 21E

Two builds of an F100 engine model derivative (EMD) engine were evaluated for improvements in engine components and digital electronic engine control (DEEC) logic. Two DEEC flight logics were verified throughout the flight envelope in support of flight clearance for the F100 engine model derivative program (EMPD). A nozzle instability and a faster augmentor transient capability was investigated in support of the F-15 DEEC flight program. Off schedule coupled system mode fan flutter, DEEC nose-boom pressure correlation, DEEC station six pressure comparison, and a new fan inlet variable vane (CIVV) schedule are identified. Author

N86-25347*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
EFFECTS OF INLET DISTORTION ON A STATIC PRESSURE PROBE MOUNTED ON THE ENGINE HUB IN AN F-15 AIRPLANE
Donald L. Hughes and Karen G. Mackall *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane Mar. 1984 p 73-89 refs (For primary document see N86-25342 16-07)
primary document see N86-25342 16-07)
(Paper-5) Avail: NTIS HC A11/MF A01 CSCL 21E

Problems encountered in obtaining good engine face pressure data were studied. A single static measurement located upstream of the engine hub in the stream flow was found to provide a pressure signal suitable for engine control. Two identical probes for measuring fan inlet static (PS2) pressure were designed and mounted on the hub of the left F100-PW-100 turbofan engine installed in the F-15 test aircraft for flight evaluation. The probe is used as a static pressure sensor for a digital engine control system. Author

N86-25348*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
FLIGHT TESTING THE DIGITAL ELECTRONIC ENGINE CONTROL IN THE F-15 AIRPLANE
Lawrence P. Myers *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane Mar. 1984 p 91-105 (For primary document see N86-25342 16-07)
(Paper-6) Avail: NTIS HC A11/MF A01 CSCL 21E

The digital electronic engine control (DEEC) is a full-authority digital engine control developed for the F100-PW-100 turbofan engine which was flight tested on an F-15 aircraft. The DEEC hardware and software throughout the F-15 flight envelope was evaluated. Real-time data reduction and data display systems were implemented. New test techniques and stronger coordination between the propulsion test engineer and pilot were developed which produced efficient use of test time, reduced pilot work load, and greatly improved quality data. The engine pressure ratio (EPR) control mode is demonstrated. It is found that the nonaugmented throttle transients and engine performance are satisfactory. Author

N86-25349*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
DIGITAL ELECTRONIC ENGINE CONTROL FAULT DETECTION AND ACCOMMODATION FLIGHT EVALUATION

Jennifer L. Baer-Ruedhart *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in n F-15 Airplane Mar. 1984 p 107-126 (For primary document see N86-25342 16-07)
(Paper-7) Avail: NTIS HC A11/MF A01 CSCL 21E

The capabilities and performance of various fault detection and accommodation (FDA) schemes in existing and projected engine control systems were investigated. Flight tests of the digital electronic engine control (DEEC) in an F-15 aircraft show discrepancies between flight results and predictions based on simulation and altitude testing. The FDA methodology and logic in the DEEC system, and the results of the flight failures which occurred to date are described. E.A.K.

N86-25350*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
AIRSTART PERFORMANCE OF A DIGITAL ELECTRONIC ENGINE CONTROL SYSTEM ON AN F100 ENGINE
Frank W. Burcham, Jr. *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane Mar. 1984 p 127-139 (For primary document see N86-25342 16-07)
(Paper-8) Avail: NTIS HC A11/MF A01 CSCL 21E

The digital electronic engine control (DEEC) system installed on an F100 engine in an F-15 aircraft was tested. The DEEC system incorporates a closed-loop air start feature in which the fuel flow is modulated to achieve the desired rate of compressor acceleration. With this logic the DEEC equipped F100 engine can achieve air starts over a larger envelope. The DEEC air start logic, the test program conducted on the F-15, and its results are described. Author

N86-25351*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
FLIGHT EVALUATION OF A HYDROMECHANICAL BACKUP CONTROL FOR THE DIGITAL ELECTRONIC ENGINE CONTROL SYSTEM IN AN F100 ENGINE
Kevin R. Walsh and Frank W. Burcham *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane Mar. 1984 p 141-155 (For primary document see N86-25342 16-07)
(Paper-9) Avail: NTIS HC A11/MF A01 CSCL 21E

The backup control (BUC) features, the operation of the BUC system, the BUC control logic, and the BUC flight test results are described. The flight test results include: (1) transfers to the BUC at military and maximum power settings; (2) a military power acceleration showing comparisons bvetween flight and simulation for BUC and primary modes; (3) steady-state idle power showing idle compressor speeds at different flight conditions; and (4) idle-to-military power BUC transients showing where compressor stalls occurred for different ramp rates and idle speeds. All the BUC transfers which occur during the DEEC flight program are initiated by the pilot. Automatic transfers to the BUC do not occur. Author

N86-25352*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
BACKUP CONTROL AIRSTART PERFORMANCE ON A DIGITAL ELECTRONIC ENGINE CONTROL-EQUIPPED F100-ENGINE
J. Blair Johnson *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane Mar. 1984 p 157-170 refs (For primary document see N86-25342 16-07)
(Paper-10) Avail: NTIS HC A11/MF A01 CSCL 21E

The air start capability of a backup control (BUC) was tested for a digital electronic engine control (DEEC) equipped F100 engine, which was installed in an F-15 aircraft. Two air start schedules were tested. Using the group 1 start schedule, based on a 40 sec timer, an air speed of 300 knots was required to ensure successful 40 and 25% BUC mode spooldown airstarts. If core rotor speed (N2) was less than 40% a stall would occur when the start bleed closed, 40 sec after initiation of the air start. All jet fuel starter (JFS) assisted air starts were successful with the group 1 start schedule. For the group 2 schedule, the time between pressurization and start bleed closure ranged between 50 sec and 72 sec. Idle rps was lower than the desired 65% for air starts at higher altitudes and lower air speeds. Author

N86-25353*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
AUGMENTOR TRANSIENT CAPABILITY OF AN F100 ENGINE EQUIPPED WITH A DIGITAL ELECTRONIC ENGINE CONTROL
Frank W. Burcham, Jr. and G. David Pai *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane Mar. 1984 p 171-199 (For primary document see N86-25342 16-07)
(Paper-11) Avail: NTIS HC A11/MF A01 CSCL 21E

An F100 augmented turbofan engine equipped with digital electronic engine control (DEEC) system was evaluated. The engine was equipped with a specially modified augmentor to provide improved steady state and transient augmentor capability. The combination of the DEEC and the modified augmentor was evaluated in sea level and altitude facility tests and then in four different flight phases in an F-15 aircraft. The augmentor configuration, logic, and test results are presented. Author

N86-25354*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
INVESTIGATION OF A NOZZLE INSTABILITY ON AN F100 ENGINE EQUIPPED WITH A DIGITAL ELECTRONIC ENGINE CONTROL
Frank W. Burcham, Jr. and John R. Zeller (NASA, Lewis Research Center, Cleveland, Ohio) *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane Mar. 1984 p 201-214 (For primary document see N86-25342 16-07)
(Paper-12) Avail: NTIS HC A11/MF A01 CSCL 21E

An instability in the nozzle of the F100 engine, equipped with a digital electronic engine control (DEEC), was observed during a flight evaluation on an F-15 aircraft. The instability occurred in the upper left hand corner (ULMC) of the flight envelope during augmentation. The instability was not predicted by stability analysis, closed-loop simulations of the the engine, or altitude testing of the engine. The instability caused stalls and augmentor blowouts. The nozzle instability and the altitude testing are described. Linear analysis and nonlinear digital simulation test results are presented. Software modifications on further flight test are discussed. Author

N86-25355*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
REAL-TIME IN-FLIGHT THRUST CALCULATION ON A DIGITAL ELECTRONIC ENGINE CONTROL-EQUIPPED F100 ENGINE IN AN F-15 AIRPLANE
Ronald J. Ray (California Polytechnic State Univ., San Luis Obispo) and Lawrence P. Myers *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane Mar. 1984 p 231-247 (For primary document see N86-25342 16-07)
(Paper-13) Avail: NTIS HC A11/MF A01 CSCL 21E

Computer algorithms which calculate in-flight engine and aircraft performance real-time are discussed. The first step was completed with the implementation of a real-time thrust calculation program on a digital electronic engine control (DEEC) equiped F100 engine in an F-15 aircraft. The in-flight thrust modifications that allow calculations to be performed in real-time, to compare results to predictions, are presented. Author

N86-25356*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
CONTROL TECHNOLOGY FOR FUTURE AIRCRAFT PROPULSION SYSTEMS
John R. Zeller, John R. Szuch, Walter C. Merrill, Bruce Lehtinen, and James F. Soeder *In its* Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane Mar. 1984 p 231-247 (For primary document see N86-25342 16-07)
(Paper-14) Avail: NTIS HC A11/MF A01 CSCL 21E

The need for a more sophisticated engine control system is discussed. The improvements in better thrust-to-weight ratios demand the manipulation of more control inputs. New technological solutions to the engine control problem are practiced. The digital electronic engine control (DEEC) system is a step in the evolution to digital electronic engine control. Technology issues are addressed to ensure a growth in confidence in sophisticated electronic controls for aircraft turbine engines. The need of a control

system architecture which permits propulsion controls to be functionally integrated with other aircraft systems is established. Areas of technology studied include: (1) control design methodology; (2) improved modeling and simulation methods; and (3) implementation technologies. Objectives, results and future thrusts are summarized. E.A.K.

N86-25357*# Douglas Aircraft Co., Inc., Long Beach, Calif.
TURBOFAN AFT DUCT SUPPRESSOR STUDY PROGRAM LISTING AND USER'S GUIDE Final Report
M. C. Joshi and R. E. Kraft May 1983 104 p
(Contract NAS3-22766)
(NASA-CR-175067; NAS 1.26:175067) Avail: NTIS HC A06/MF A01 CSCL 21E

A description of the structure of the Annular Flow Duct Program (AFDP) for the calculation of acoustic suppression due to treatment in a finite length annular duct carrying sheared flow is presented. Although most appropriate for engine exhaust ducts, this program can be used to study sound propagation in any duct that maintains annular geometry over a considerable length of the duct. The program is based on the modal analysis of sound propagation in ducts with axial segments of different wall impedances. For specified duct geometry, wall impedance, flow and acoustic conditions in the duct (including mode amplitude distribution of the source) and duct termination reflection characteristics, the program calculates the suppression due to the treatment in the duct. The presence of forward and backward traveling modes in the duct due to the reflection and redistribution of modes at segment interfaces and duct end terminations are taken into account in the calculations. The effects of thin wall boundary layers (with a linear or mean flow velocity profile) on the acoustic propagation are also included in the program. A functional description of the major subroutines is included and a sample run is provided with an explanation of the output. M.G.

N86-25358# Ohio State Univ., Columbus. Research Foundation.
TURBULENT FLOW OVER ROUGH TURBINE AIRFOILS Final Report, Jun. 1983 - Dec. 1984
Lit S. Han Aug. 1985 83 p
(Contract F33615-82-K-2218)
(AD-A163005; OSURF-763057/714467; AFWAL-TR-85-2056)
Avail: NTIS HC A05/MF A01 CSCL 21/5

A method to analyze turbulent boundary layer over rough turbine vanes or blades is developed. A new formulation of the mixing length model, expressed in the velocity-space variable, is instrumental in the modeling effort, and the surface roughness effect is embedded in an amplification factor as a multiplier to the mixing length. (The amplification factor ranges from unity for a smooth surface upward for rough surfaces, with its variation depending on the type of roughness). For demonstration, the new method is applied to the analysis of turbulent flow over a flat plate with two surface roughnesses. For a plate length with a length Reynolds number of 10 million, skin friction is increased by as much as 60 percent, if the roughness-to-length ratio is 0.0001. GRA

N86-25359# Adiabatics, Inc., Columbus, Ind.
FORMATION OF A NATURAL GAS ENGINE DATA BASE Final Report, Apr. 1984 - Jan. 1985
R. Kamo and L. Kamo Oct. 1985 80 p refs
(Contract GRI-5084-233-0969)
(PB86-154010; GRI-85/0112) Avail: NTIS HC A05/MF A01 CSCL 21E

A study was conducted to assess the present natural gas engine technology with the objective of laying the groundwork for the development of advanced natural gas powerplants. Literature search, consultations, field trips, oversea visits, and analyses were performed to identify the critical path and a network diagram for the future was constructed. Today's engine base was reviewed and, worldwide, natural gas engines in the five to 1000 horsepower range are presented. Problem areas of the natural gas engines were identified with near term fixes and long term development work. Some new powerplant technologies; namely, adiabatic turbocompound, two-stroke engines, the rotary engine and gas turbines are beginning to show potential for natural gas powerplants. For high engine performance, a Miller cycle with fuel injection, lean combustion, high compression ratio and turbocharging is recommended together with adequate use of ceramic and other advanced materials for long life (40,000 hours) natural gas engines. Author

N86-25360# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Structures and Materials Panel.
DAMAGE TOLERANCE CONCEPTS FOR CRITICAL ENGINE COMPONENTS
Loughton, England Oct. 1985 295 p refs Presented in San Antonio, Tex., 22-26 Apr. 1985
(AGARD-CP-393; ISBN-92-835-0380-5) Avail: NTIS HC A13/MF A01

The proceedings of a specialist meeting called by the AGARD Structures and Materials Panel on damage tolerance concepts for critical engine components is presented. The meeting discussed the overall philosophy of damage tolerance as applied to aircraft engine parts, considered and refined the parameters important in DTC, reviewed specialist techniques needed for the support of DTC, and surveyed the prospects for and experiences of the implementation of DTC. For individual titles, see N86-25361 through N86-25383.

N86-25361# Rolls-Royce Ltd., Derby (England).
DAMAGE TOLERANCE CONCEPTS FOR CRITICAL ENGINE COMPONENTS
R. H. Jeal *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 12 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

The cost of failures in gas turbines has always been so high, both in human and financial terms, that it has been recognized since the earliest days that the behavior of components had to be fully characterized before the engines were used in service. The integrity of the gas turbine has therefore always been based upon two separate phases of development. The first has been the basic design itself where, as well as ensuring that the individual components meet their basic mechanical purpose, the designer attempts to match his understanding of the operating conditions to his perception of the capability of material chosen. The second has been the development phase where the actual behavior of the component has been assessed either as part of an operating engine - bench engine testing or as an individual component - rig testing - under conditions which are related to those the engine is expected to see in service. The results of this work are then used, together with prior experience, to identify the critical components of the engine, those that prejudice the safety of the aircraft if they fail. The development of damage tolerance concepts is traced from the earliest days, the current situation is examined in light of design needs and available technology, and possible directions are examined. E.R.

N86-25362# Naval Air Propulsion Test Center, Trenton, N.J. Systems Development and Evaluation Group.
ENGINE CYCLIC DURABILITY BY ANALYSIS AND TESTING: HIGHLIGHTS OF THE SPRING 1984 PEP MEETING
Albert A. Martino *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 13 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

Research on gas turbine engine development during the past decade in NATO nations has concentrated heavily on gaining better understanding of the relationship between material characteristics, failure mechanisms, structural analysis and validation testing for increased service life. Recognizing this intense interest and activity level the Propulsion and Energetics Panel (PEP) sponsored a specialists' meeting that surveyed the state-of-art technical areas related to improving engine life and considered the technical and economical problems and possibilities of advanced cyclic testing

in the development of engines. Discussions focused on relationships between engine use and failure modes, accelerated mission testing (AMT) development, critical material characteristics, component life assessment methods, recent results of component and engine cyclic testing, and future requirements. Author

N86-25363# Air Force Systems Command, Wright-Patterson AFB, Ohio.

DAMAGE TOLERANCE DESIGN CONCEPTS FOR MILITARY ENGINES

T. T. King, W. D. Cowie, and W. H. Reimann *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 13 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

The damage tolerance requirements that are applied to Air Force engine development programs are summarized. These requirements are an integral part of the Engine Structural Integrity Program (ENSIP). Application of damage tolerance requirements to existing inventory engines (F100 and TF34) has resulted in implementation of enhanced nondestructive evaluation methods at manufacturing and at field/depot. Experience has shown that these inspections have been successful in detecting early cracking and accelerating corrective actions. It has been highlighted that several development efforts in the last five years have identified FPI process improvements that must be implemented within industry and Air Force depots to improve flaw detection reliability. The need to quantify detection reliability for imbedded defects is also identified. The engine development process has been evolutionary in terms of application of upgraded requirements. The new process is contained in ENSIP. Recent experience clearly demonstrates that the damage tolerance requirement is cost effective when assessed on a life cycle basis. Author

N86-25364# Toronto Univ. (Ontario). Dept. of Mechanical Engineering.

PARAMETERS THAT INPUT TO APPLICATION OF DAMAGE TOLERANCE CONCEPTS TO CRITICAL ENGINE COMPONENTS

D. W. Hoeppner *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 13 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

Numerous parameters affect the application of damage tolerance concepts to engine components. These parameters are reviewed in relation to overall integration of each parameter into the damage tolerance design methodology. Parameters such as initial crack size, defect level associated with the material and process, and model of the initial crack are discussed as related to nondestructive inspection and modelling the discontinuity within a framework such as generalized fracture mechanics. Subsequent to characterization of the initial discontinuity or heterogeneity (d,h), or the likelihood of forming one in the service cycle, it is necessary to evaluate the potential for growth of a (d,h). Factors that affect the growth of a discontinuity in engines are: material, manufacturing route, stress magnitude, stress state, (uniaxial, biaxial, triaxial), residual stress, temperature, loading waveform, frequency of loading, loading spectrum, chemical environment. Furthermore, material properties of importance are thresholds of growth, fatigue crack growth behavior, and toughness. Numerous synergisms such as creep fatigue, corrosion fatigue, and fretting fatigue occur and must be considered. Evaluation of these parameters is discussed, gaps are identified, and an overall plan to integrate these into a safety critical component design methodology is presented. Author

N86-25365# Rolls-Royce Ltd., Derby (England). NDT Technology.

LIMITATIONS OF MANUAL NDT SYSTEMS AND THE NO EYES CONCEPT

R. G. Taylor *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 9 p refs Previously announced as N86-14215 (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

Defect tolerant design, particularly of aircraft components, and its links with nondestructive testing (NDT) are discussed. Engineering of the NDT technique, defect detection requirements, and human factors in the inspection cycle are considered. Author

N86-25366# Royal Aircraft Establishment, Farnborough (England). Propulsion Dept.

THE ROLE OF THERMAL AND STRESS ANALYSES IN THE APPLICATION OF DAMAGE TOLERANT DESIGN

G. F. Harrison and T. H. Edmunds (Rolls-Royce Ltd., Bristol, England) *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 16 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

Some of the important factors affecting the accuracy of proven analysis techniques in support of a damage tolerant design methodology are illustrated. Temperature sensitivity analysis and the relevance of component geometry in controlling characterized material behavior into models suitable in stress analysis is demonstrated. Examples indentifying critical stresses and critical locations in typical engine discs are presented. The implementation of fracture mechanics analysis methods to these regions is discussed. Finally their relevance to damage tolerant design concepts is evaluated. Author

N86-25367# Minho Univ., Braga (Portugal).

DAMAGE TOLERANCE ACCEPTANCE METHODS IN STRUCTURAL COMPONENTS OF A MEDIUM CARBON STEEL AND A MEDIUM STRENGTH Al-Mg ALLOY

C. M. Branco *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 16 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

A review of damage tolerance methodology is presented referring to main factors, parameters and computational procedure for the assessment of flaws in the structure in order to avoid fatigue failures. Flaw acceptance and fatigue design methods are also reviewed and dicussed. Results of a defect tolerance study in cruciform welded joints of low and medium strength steels are presented. Theoretical defect tolerance curves relating initial flaw sizes, applied nominal stress, endurance and weld and plate geometry are obtained. The results are compared with some experimental data and also with the medium strength Al-Mg alloy 5083. COD and J integral data for this material is presented in the temperature range -120 C to 200 C. Author

N86-25368# Systems Research Labs., Inc., Dayton, Ohio. NDE Systems Div.

MANUFACTURING TECHNOLOGY FOR NONDESTRUCTIVE EVALUATION (NDE) SYSTEM TO IMPLEMENT RETIREMENT FOR CAUSE (RFC) PROCEDURES FOR GAS TURBINE ENGINE COMPONENTS

Donald L. Birx and Dena G. Doolin *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 8 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

An automated NDE inspection system to detect surface flaws and inclusions in jet engine rotary parts was developed. The system implements the Air Force Retirement for Cause philosophy in which good, used engine parts are returned to service, and flawed components are retired for cause. Emphasis has thus been placed on improving current flaw detection and characterization techniques by using computer algorithms (removing the human decision process) and achieving basic inspection and predictive capabilities via automated eddy current and ultrasonic inspection techniques. Author

N86-25369# National Aerospace Lab., Amsterdam (Netherlands).

AGARD COOPERATIVE TEST PROGAMME ON TITANIUM ALLOY ENGINE DISC MATERIAL

A. J. A. Mom and M. D. Raizenne (National Research Council of Canada, Ottawa, Ontario) *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 15 p refs (For primary document see N86-25360 16-07)

Avail: NTIS HC A13/MF A01

In recent years a strong interest in the application of damage tolerance techniques for lifing of gas turbine engine discs has developed. Before the damage tolerance approach can be safely implemented it requires sensitive and reliable crack detection techniques, operational loading information and improved knowledge of fatigue crack growth and fracture under service conditions. This latter aspect is the main subject of an international test program, in which a number of laboratories from North America and Europe participate under AGARD coordination. The first phase of the program is directed to test and specimen standardization and calibration of the different laboratories. The second phase will specifically address parameters relevant for real service operation like mission loading, sequence and dwell effects, temperature, fatigue threshold, etc. The background and first phase of the program are discussed. Author

N86-25370# Cambridge Univ. (England). Dept. of Metallurgy and Materials Science.

ASPECTS OF SMALL CRACK GROWTH **c26**

M. N. James and J. F. Knott *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 16 p refs (For primary document see N86-25360 16-07)

Avail: NTIS HC A13/MF A01

The nature of small defects which occur in engineering components and structures, and their subsequent growth to a size detectable by nondestructive inspection techniques are discussed. Consideration is given to fundamental aspects such as the modifying influence of residual stresses and crack closure on the growth of small cracks. Possible differences between laboratory test data and in-service crack growth are highlighted. Practical aspects are illustrated with specific reference to the example of the safety-critical high pressure turbine disc of an aeroengine. Author

N86-25371# Royal Aircraft Establishment, Farnborough (England). Propulsion Dept.

CRACK GROWTH IN NEAR-ALPHA TITANIUM ALLOYS **c38**

C. R. Gostelow *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 5 p refs (For primary document see N86-25360 16-07)

Avail: NTIS HC A13/MF A01

Ever since the first gas turbine aero engine entered into service there has been pressure to develop more powerful yet more efficient and lightweight units. To this end manufacturers have endeavored to increase overall pressure ratios and maximum cycle temperatures while trying to limit engine size by using materials having higher strength-to-weight ratios and higher temperature capability. Two main material approaches were followed in order to help meet these requirements. These are the development of high strength, high temperature capability nickel base superalloys for extensive use in the turbine and the replacement of heavy steels and nickel alloys in the compressor by advanced lightweight titanium alloys. The latter approach was the driving force behind the development in the UK of a unique range of creep-resistant near-alpha titanium alloys suitable for use up to 600 C. A variety of parameters are described which can influence the crack growth characteristics of near-alpha titanium alloys, with particular reference to the UK alloy IMI685. The relevance of these laboratory data to actual engine operation is assessed. Author

N86-25372# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

CRACK GROWTH, STRAIN AND DAMAGE MEASUREMENTS USING AN IMPROVED POTENTIAL DROP TECHNIQUE **c26**

Humbert Policella, Georges Baudin, and Georges Cailletaud *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 9 p refs In FRENCH; ENGLISH summary (For primary document see N86-25360 16-07)

Avail: NTIS HC A13/MF A01

An improved version of the potential drop technique and its applications to crack length, strain and damage measurements is presented. The electronic device, developed at ONERA, which supplies the specimen with a pulsed current is described. Two types of applications are then presented. In the first type several tests were conducted on two dimensional cracked specimens, made of different materials at different temperatures. An extension of the method was also made to three dimensional crack fronts. The potential drop in an uncracked strained solid was the sum of three terms, respectively due to elastic strain, plastic strain and damage. Applications were performed on AISI 316 steel at room temperature, INCO 718 at 650 C and UN 100 at 900 C and 1000 C. The plastic strain and damage determined with the P.D. technique are then compared with the ones measured using others methods. Author

N86-25373# Fiat Research Center, Orbassano, Turin (Italy).

SMALL DEFECT CHARACTERIZATION IN POWDER METALLURGY MATERIALS **c39**

S. Re Fiorentin and H. Walther (Fiat Aviazione S.p.A., Turin, Italy) *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 12 p refs (For primary document see N86-25360 16-07)

Avail: NTIS HC A13/MF A01

Powder metallurgy nickel base superalloys are becoming important structural materials for the manufacturing of critical complex-shaped aircraft components (e.g. turbine disks). Since fatigue life is largely affected by the presence of defects, in order to extend the limit of application of PM materials as far as possible, the need is felt for a nondestructive technique capable of detecting defects of size down to approximately 50 micrometers. An ultrasonic technique is presented which allows the detection and characterization of such small defects. It is based on the analysis of the signals backscattered by the material lying in the focal region of a short pulse transducer. During a first overall inspection of the component a real time data processing allows both the detection of critical defects and the evaluation of average grain size. In successive local inspections, confined in the regions where inclusions have been detected, further information on their characteristics may be collected. Some experimental results obtained on powder metallurgy samples containing seeded inclusions are presented. Author

N86-25374# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

ADVANCED EXPERIMENTAL METHODS FOR MONITORING THE BEHAVIOR OF SMALL CRACKS **c26**

James M. Larsen *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 9 p refs (For primary document see N86-25360 16-07)

Avail: NTIS HC A13/MF A01

Two specialized techniques for monitoring the behavior of small fatigue cracks are discussed. The first of these is an automated photomicroscopic system that produces a permanent photographic record of the growth of small surface cracks. The system is automated by a microcomputer which controls fatigue testing and operates a 35 mm camera. Data are obtained for the growth of small cracks of approximate sizes ranging from 25 micrometers to fracture. The precision of the photographic measurements is approximately 1 micrometer for cracks of the order of 25 micrometers in length. In addition to the photographic technique, a unique Interferometric displacement gage (IDG) which monitors the crack mouth opening behavior of small surface cracks is discussed. The IDG measurements produce a complete record of applied load vs. crack opening displacement. The load-displacement data are analyzed to determine effective crack length from compliance calibrations and to determine crack closure behavior. The capabilities of both the photomicroscopic and the interferometric techniques are discussed, and typical small crack data are presented. Author

N86-25375# TRW, Inc., Cleveland, Ohio.

MULTIAXIAL AND THERMOMECHANICAL FATIGUE CONSIDERATIONS IN DAMAGE TOLERANT DESIGN **c39**

Gail E. Leese and Robert C. Bill (Army Research and Technology Labs., Cleveland, Ohio) *In* AGARD Damage Tolerance Concepts

for Critical Engine Components Oct. 1985 17 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

In considering damage tolerant design concepts for gas turbine hot section components, several challenging concerns arise: Complex multiaxial loading situations are encountered; thermomechanical fatigue loading involving very wide temperature ranges is imposed on components; some hot section materials are extremely anisotropic; and coatings and environmental interactions play an important role in crack propagation. The effects of multiaxiality and thermomechanical fatigue are considered from the standpoint of their impact on damage tolerant design concepts. Recently obtained research results as well as results from the open literature are examined and their implications for damage tolerant design are discussed. Three important needs required to advance analytical capabilities in support of damage tolerant design become readily apparent: (1) a theoretical basis to account for the effect of nonproportional loading (mechanical and mechanical/thermal); (2) the development of practical crack growth parameters that are applicable to thermomechanical fatigue situations; (3) the development of crack growth models that address multiple crack failures. Author

N86-25376# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Materials Lab.
ADVANCED QUANTITATIVE METHODS FOR NONDESTRUCTIVE EVALUATION **c26**
Dale E. Chimenti and Thomas J. Moran *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 17 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

Over the past decade and a half progress in nondestructive evaluation (NDE) methods which yield quantitative flaw information has been considerable and has sparked a revolution in the way industry and government view the capabilities and benefits of quality assurance or component integrity. Almost no NDE technique, new or established, is selected for research and development without examining its potential for providing accurate, quantitative defect information. Concurrent with this trend has been the increasing use of fracture mechanics in the design and life management of aircraft systems, placing in turn stringent requirements on quantitative nondestructive evaluation (QNDE). Nowhere are these demands heavier than in the case of advanced aircraft engine alloys where critical flaw sizes are measured in hundredths of an inch. Research in NDE, therefore, has concentrated on improving defect sensitivity and reliability and providing the quantitative information essential to the new system maintenance philosophies, such as Retirement-for-Cause. In addition to the well-known quantitative capabilities of standard techniques like radiography, dye penetrant, and in some cases, eddy current, developments in quantitative ultrasonics, eddy current, thermal wave techniques and exploitation of new medicial X-ray imaging methods offer alternatives with enhanced capabilities and possibly reduced cost. The state of the art in QNDE is discussed, as well as advanced methods currently in development. Author

N86-25377# Naval Air Development Center, Warminster, Pa.
STATISTICAL ANALYSIS OF SPIN PIT FAILURE DATA TO PREDICT INSERVICE B.1 LIVES OF GAS TURBINE DISKS **c39**
R. Mahorter, S. Fowler, and J. Salvino (Naval Air Propulsion Test Center, Trenton, N.J.) *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 15 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

Currently used analytical predictive methods for establishing gas turbine disk lives have basic limitations associated with stress, thermal, and mission analyses among other factors. The difference between predicted life and actual in-service life is usually not known since most parts are removed from service prior to crack formation. The Navy is developing a predictive method based on statistical analysis of data from parts run to crack initiation in spin pit testing. As part of this work, the minimum number of disks needed to establish a viable predictive method is determined. Although data from the small sample size (5) used has a great deal of statistical uncertainty, it appears that analytical predictions may be anti-conservative. Author

N86-25378# Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn (West Germany).
FRACTURE MECHANICS AND LCF-PROPERTIES OF ENGINE DISCS OF TI 6AI-4V, INCONEL 718 AND UDIMET 700 P/M-HIP
Walter Schuetz and R. Heidenreich refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

Over the last decade IABG has carried out a large number of tests on gas turbine materials to determine the materials data necessary for the conventional lifing approach, that is LCF data, including dwell time effects and some HCF data. The data necessary for a damage tolerance approach as well as crack propagation properties were also determined. These tests were done at room and typical service temperatures. The materials were Ti 6A1 4V, Inconel 718 and Udimet 700 P/M-HIP. The specimens were machined from a number of nominally identical compressor discs of Ti A16 V4, from compressor discs of Inconel 718 and from disc-shaped pancakes of Udiment 700 P/M-HIP. Constant amplitude tests under strain control with unnotched specimens and under stress control with notched specimens were carried out, as well as a number or relatively simple variable amplitude tests. Author

N86-25379# Technische Univ., Munich (West Germany). Materials Lab.
EVALUATION OF CYCLIC SPIN PIT TESTS FOR THE DAMAGE TOLERANCE OF DISKS
H. Huff and G. W. Koenig *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 13 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

In order to determine the damage tolerance at critical areas of nickelbase engine disks (bore, eccentric hole, blade slot) the crack propagation behavior was investigated. The experiments include cyclic spin pit tests on disks and fracture mechanics tests on small crack specimens. The results of the spin pit tests are compared with the crack propagation behavior predicted by fracture mechanics. The tolerance of engine disks with respect to small crack-like defects is estimated and the potential of the crack propagation life for application in service is discussed. It was found that at low and intermediate temperatures the crack propagation life is sufficient to cover a substantial portion of the life required for disks. With increasing temperature the influence of time dependent processes results in a very strong reduction of the defect tolerance. Author

N86-25380# National Aerospace Lab., Amsterdam (Netherlands).
TURBISTAN: A STANDARD LOAD SEQUENCE FOR AIRCRAFT ENGINE DISCS **c38**
A. J. A. Mom, W. J. Evans (Royal Aircraft Establishment, Farnborough, England), and A. A. tenHave *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 12 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

The development of TURBISTAN is a joint international effort to derive a loading standard representative for fighter aircraft engine disc usage. A representative loading standard offers considerable potential advantages over the present zero-max type of loading used for disc material evaluation. This is because the standard incorporates the effects of subcycles, their number, magnitude and sequence, which are known to seriously affect disc life and for which current life prediction techniques only partly account. Therefore usage of the standard in fatigue tests provides an improved evaluation of material properties, structural details, fabrication techniques, surface quality and life prediction. The compilation of operational flight data is described along with their analysis and the generation of a preliminary TURBISTAN sequence for cold compressor discs. The sequence contains

about 8000 cycles which represent 100 flights. In addition, the background and philosophy of a material testing program meant to assess the effectiveness of the standard and to explore the validity of the assumptions made in its derivation is described.
Author

N86-25381# Rolls-Royce Ltd., Derby (England).
AN ANALYSIS OF RIG TEST DISC FAILURES c38
G. Asquith *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 10 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

A major objective in gas turbine engineering is the design and manufacture of discs that are reliable in service. Much depends on the accurate prediction of safe total lives and inspection intervals. Accurate predictions come from a complete understanding of material behavior involving experimentation, interpretation and quantification, for which a balanced program of laboratory specimen and full sized disc evaluation is required. Cyclic testing of full size discs is essential, this allows each disc to do its own Monte Carlo evaluation of the large number of variables that affect the final result. Where life can be predicted entirely by linear elastic fracture mechanics some simplification can be introduced; this encourages studies in the quantification of short crack propagation behavior.
Author

N86-25382# National Aerospace Lab., Amsterdam (Netherlands).
CONTRIBUTION OF TURBINE BLADE SERVICE FAILURES TO A DAMAGE TOLERANCE APPROACH c39
R. J. H. Wanhill and A. J. A. Mom *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 13 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

Modified repair of uprated first stage turbine blades from large turbofans was followed by several fatigue failures in service. The failure mode was low and high cycle fatigue starting at leading edge cooling holes. Fractographic and metallographic analysis indicated that insufficient thickness of the leading edge walls was a primary cause of failure. A more comprehensive investigation by the engine manufacturer showed that other parameters besides leading edge wall thickness could be primary causes of failure, namely the leading edge and serpentine airflows and the backflow margin. Relative life reduction factors based on combinations of all four parameters were estimated for many failed, cracked and nominally undamaged blades. Then it became possible to reject blades with unacceptable life reduction factors both before and after repair. This is effectively a life-on-condition damage tolerance approach to blade use.
Author

N86-25383# National Research Council of Canada, Ottawa (Ontario).
PRACTICAL EXPERIENCE WITH DAMAGE TOLERANCE BASED LIFE EXTENTION OF TURBINE ENGINE COMPONENTS c38
A. K. Koul, R. Thamburaj (Carleton Univ., Ottawa, Ontario), M. D. Raizenne, W. Wallace, and M. C. DeMalherbe *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 9 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

A detailed experimental and statistical analysis carried out to determine the risks and benefit of implementing a damage tolerance based lifing procedure for the General Electric J85-CAN40 engine is described. This is a post-facto investigation, using components of this engine retired by the Canadian Forces and the data available regarding these used parts. The emphasis is on the 5th stage compressor disk, which is one of the most crack prone components of this engine. A number of procedures were demonstrated by which the safe life and the safe inspection interval for this component can be calculated reliably. The possibility of improving the existing lifing procedure through a damage tolerance approach, and the limitations of the damage tolerance approach are discussed on the basis of experimental observations and information available from field experience.
Author

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N86-25384# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN LQG UP-AND AWAY FLIGHT CONTROL DESIGN FOR THE STOL F-15 AIRCRAFT M.S. Thesis
Robert A. Houston Dec. 1985 243 p refs
(AD-A164108; AFIT/GE/ENG/85D-21) Avail: NTIS HC A11/MF A01 CSCL 01/4

A robust controller for the STOL F-15 aircraft is developed using the LQG/LTR (linear system model, quadratic cost, gaussian models of uncertainty used for controller synthesis, with loop transfer recovery techniques of tuning the filter in the loop for control robustness enhancement) methods. Full state feedback controllers are synthesized using CGT/PI (Command Generator Tracking feedforward compensator to provide direct incoporation of flying qualities into the design process, with proportional plus integral feedback control) synthesis, using implicit model following techniques to improve full state robustness characteristics. Finally, a Kalman filter is used to replace the unrealistic assumption of full state availability with estimated states, using a LTR scheme to recover as much full state robustness characteristics as possible.
GRA

N86-25563# Joint Publications Research Service, Arlington, Va.
OSCILLATIONS IN JET STRIKING BARRIER Abstract Only
V. Ye. Kuzmina *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 5 Transl. into ENGLISH from Vestnik Leningradskogo Universiteta: Matematika, Mekhanika, Astronomiya (Leningrad, USSR), no. 1, Jan. - Mar. 1985 p 63-69 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25603# Joint Publications Research Service, Arlington, Va.
ROLE OF OPTIMIZATION METHODS IN IMPROVEMENT OF FLIGHT CONTROL FOR AIRPLANES Abstract Only
G. M. Kashin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 10 Transl. into ENGLISH from Standarty i Kachestvo (Moscow, USSR), no. 12, Dec. 1984 p 15-18 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N86-25385# Drexel Univ., Philadelphia, Pa. Dept. of Civil Engineering.
MATERIALS FOR EMERGENCY REPAIR OF RUNWAYS Final Report, 1 Apr. 1984 - 14 Feb. 1985
Sandor Popovics 20 Mar. 1985 236 p refs
(Grant AF-AFOSR-0245-83)
(AD-A164225; Rept-001120-1; AFOSR-85-1229TR) Avail: NTIS HC A11/MF A01 CSCL 11/2

The primary objective of this project was to identify or develop an inorganic cementing material that is suitable for emergency repair of damaged airport runways under war conditions. In the first half of the work several commercially available rapid hardening cements were screen-tested as presented in an earlier progress report. It was established on this basis that the SET-45 formulas and their modifications appeared to be the most promising for

achieving the given objectives of this project. These objectives were: at least 2000 psi compressive strength at the age of 1 hour; adequately long setting time; good bond to old concrete; and minimum shrinkage under every weather condition. Since then both mechanical (compressive and flexural strengths, bond, shrinkage, etc.) and physicochemical tests (X-ray diffraction, scanning electron microscopy, infrared spectroscopy, etc.) were performed with these materials to see the technically important properties of these cements under various curing conditions and learn about the basic nature of these materials. GRA

N86-25386# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
BOMB CRATER REPAIR TECHNIQUES FOR PERMANENT AIRFIELDS, SERIES 2 AND 3 TESTS
Samuel J. Alford and George M. Hammitt, II Oct. 1985 79 p refs
(AD-A164394; WES-TR-GL-81-12; Rept-2) Avail: NTIS HC A05/MF A01 CSCL 13/12

This study is a continuation of Report 1 of this series that described Series 1 tests which were performed using different field methods of repair and restoration of bomb craters. Results from Series 1 tests showed problem areas that needed correction when the crater repairs were trafficked with full-scale loading. Two series, Series 2 and 3, of tests were run to determine if: (1) the loose stone problem at the surface could be eliminated from the well-graded crushed limestone, (2) materials could be used that would neither be affected by the weather nor require any compaction equipment, (3) a crushed aggregate that engineering troops in Germany were trying to use could be stabilized under traffic, (4) a way could be found to place grout with a minimum of equipment, (5) it was possible to cut down on portland cement concrete curing time, and (6) an unconventional pavement repair could be used. Testing consisted of accelerated traffic using either single- and/or multiple-wheel gear assemblies. Author (GRA)

N86-25387# Naval Postgraduate School, Monterey, Calif.
AN ANALYSIS OF THE PERFORMANCE OF THE FANS OF A WIND TUNNEL AT THE NAVAL POSTGRADUATE SCHOOL M.S. Thesis
Marcos L. Pereira Dec. 1985 94 p refs
(AD-A164492; AD-E900539) Avail: NTIS HC A05/MF A01 CSCL 20/4

The large subsonic academic wind tunnel at NPS, powered by two counter-rotating fans, never achieved the design specifications. The reason for the poor performance of the tunnel was unknown but believed to be due to either poorly designed fan blades or to separation in the diffuser. Being easier to analyze, the fan blades were chosen for initial study. The approach used is a new blade element method for calculating the performance of high and intermediate solidity fans. Although this new method predicts some deviations from the original isolated blade analysis, it was found that the design was adequate and, therefore, the tunnel problem is most probably due to separation in the diffuser. GRA

N86-25388# Department of the Air Force, Washington, D.C.
TIMED PRIMATE ROTO-POSITIONER Patent Application
Clarence M. Oloff, inventor (to Air Force) Filed 17 Oct. 1985 13 p
(AD-D012101; US-Patent-Appl-SN-788199) Avail: NTIS HC A02/MF A01 CSCL 06/12

This abstract discloses an apparatus for rotating subhuman primate animal test subjects about one or more axes to minimize trauma during simulated zero or micro-gravity studies. The timed roto-positioning apparatus has a frame, a subframe rotatably attached to the frame and a carrier for a primate restraint system rotatably attached to the subframe. Two motors, controlled by a programmable controller, individually rotate the subframe and the carrier according to a preselected sequence. The preferred embodiment is a modified A-frame structure made from welded channel aluminum beans and equipped with casters and lifters to move and securely position the apparatus. A tube with rotatable fittings is used to supply drinking water to test animals and electrical slip rings are used for transmitting physiological sensor signals from the test animal through the rotating connections of the carrier, subframe and frame. Radio telemetry may be used in place of the electrical slip rings. The invention also includes the method of rotating an immobilized or immobile test subject or patient along at least one axis to minimize trauma and to simulate weightlessness. GRA

N86-25561# Joint Publications Research Service, Arlington, Va.
APPLICATION OF AVERAGING METHOD TO PROBLEM OF CONTROL SYNTHESIS Abstract Only
A. P. Vyazovik *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 4 Transl. into ENGLISH from Mekhanika Tverdogo Tela (Moscow, USSR), no. 4, Jul. - Aug. 1984 p 6-13 (For primary document see N86-25556 16-31) Avail: NTIS HC A06/MF A01

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

No abstracts in this category.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N86-25389# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
DISTRIBUTED FIFO ALLOCATION OF IDENTICAL RESOURCES USING SMALL SHARED SPACE Technical Report, 1 Apr. 1984 - 30 Nov. 1985
Michael J. Fischer, Nancy A. Lynch, James E. Burns, and Allan Borodin Oct. 1985 38 p refs
(Contract DAAG29-84-K-0058)
(AD-A163988; MIT/LCS/TM-290; ARO-20519.17-EL) Avail: NTIS HC A03/MF A01 CSCL 09/2

A simple and efficient algorithm is presented for the FIFO allocation of K identical resources among asynchronous processes which communicate via shared memory. The algorithm simulates a shared queue but uses exponentially fewer shared memory values, resulting in practical savings of time and space as well as program complexity. The algorithm is robust against processes failure through unannounced stopping, making it attractive also for use in an environment of processes of widely differing speeds. In addition to its practical advantages we show the algorithm is optimal (to within a constant factor) with respect to shared space complexity. GRA

N86-25390# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
MINIMUM IMPULSE ORBITAL EVASIVE MANEUVERS M.S. Thesis
Roger C. Burk Dec. 1985 102 p refs
(AD-A163996; AFIT/GSO/AA/85D-3) Avail: NTIS HC A06/MF A01 CSCL 22/2

A threat to a satellite is modeled as a sphere of a given radius. The satellite may be required to be outside of the sphere at a given time or never to enter the sphere at all. The threat sphere may be inertially fixed or may move in a keplerian orbit. A method is described of finding the smallest impulsive maneuver that can be made at a given time to avoid the threat. Using the linearized relationship between the satellite state vector at the maneuver time and the state at the intercept time, iterative algorithms are developed that converge on the optimal evasive

maneuver. A computer program that implements the algorithms is described. The results of the algorithm are given for several cases. An interception taken from a plausible real-world scenario is used as a basis for investigating how maneuver size varies with the geometry of the interception. GRA

N86-25391# National Telecommunications and Information Administration, Boulder, Colo. Inst. for Telecommunication Sciences.

TECHNICAL BASIS FOR THE GEOSTATIONARY SATELLITE ORBIT ANALYSIS PROGRAM (GSOAP), VERSION 2

H. Akima Nov. 1985 66 p refs

(PB86-151750; NTIA-86/183) Avail: NTIS HC A04/MF A01 CSCL 22B

The Geostationary Satellite Orbit Analysis Program (GSOAP) is computer software that analyzes system performance and mutual interference of communication satellites using the geostationary satellite orbit. Calculation of the carrier-to-interference ratio margins is an essential part of GSOAP. It involves a (CIR) variety of technical problems, i.e., Earth-station and satellite antenna radiation patterns, radio wave propagation models, and related problems such as the polarization angles of linearly polarized emissions, combining of the transmitting and receiving antenna gains, and percent of the time for which the CIR is to be protected. Various transponder arrangements in the satellites may contribute to the complexity of the calculation. The technical basis for GSOAP is described. GRA

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N86-25392# Dugway Proving Ground, Utah.

SITE INFLUENCES ON THE XM76 GRID

John White, Rick Ewald, and Christopher Biltoft 3 Feb. 1986 27 p refs

(AD-A164291; DPG-FR-86-701) Avail: NTIS HC A03/MF A01 CSCL 19/1

The XM76 Grid is a new testing location for smoke munitions where terrain and meteorological tower influences on meteorological measurements have not been previously analyzed. The primary objective is to quantify site influences on wind and turbulence data collected at the XM76 Grid. A secondary objective is to evaluate the capability of Smith and Turner stability categories to order turbulence data. Sigma A/Sigma E ratios are used to quantify terrain influences at low and high wind speeds for fetches over low, moderate, and high roughness terrain. Tower shadowing effects on wind and turbulence measurements are also quantified as a function of wind speed. Preliminary analysis of Smith versus Turner stability category techniques indicates superiority of the Smith technique for the horizontal component of turbulence. GRA

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N86-25393# Cranfield Inst. of Tech., Bedford (England). Coll. of Aeronautics.

THE EFFECT OF ATMOSPHERIC TURBULENCE ON THE DISPERSION OF UNGUIDED MISSILES

R. I. Harris and M. Curcin Feb. 1986 44 p refs Sponsored by Cranfield Inst. of Tech., Bedford (England). Prepared in cooperation with Vojnotehnicki Inst.,Belgrade (Yugoslavia)

(CAR-8613; ISBN-0-947767-38-X) Avail: NTIS HC A03/MF A01

A technique for calculating the dispersion of unguided missiles due to strong turbulent wind is presented. The three components of turbulent wind velocity are simulated along a trajectory by means of a moving average process. Variations of the statistics of turbulent wind with height are taken into account. A six degree of freedom program is used to calculate a trajectory. The effect of turbulent wind on both powered and unpowered flight is considered. The results of the calculation for two types of missiles are presented. Author

N86-25394# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

LIMIT CYCLE OF THE PLANAR NON-LINEAR MOTION OF A FINNED PROJECTILE

Zipeng Han 23 Jan. 1986 18 p refs Transl. into ENGLISH from Binggong Xuebao (China), no. 1 Feb. 1985 p 62-67

(AD-A164311; FTD-ID(RS)T-1040-85) Avail: NTIS HC A02/MF A01 CSCL 19/1

The planar non-linear motion of a finned projectile with small damp and weak non-linear static moment was studied. The stable limit cycle is used to explain the self-oscillation generated by some projectiles. The unstable limit cycle is used to investigate the causes for the fortuitous fall of some finned projectiles. In order to alleviate the effect of self-oscillation and to eliminate the fortuitous fall of projectiles, the non-linear portion of the damp moment and that of lift should be increased and the non-linear part of the drag should be decreased. GRA

N86-25395# Naval Postgraduate School, Monterey, Calif.

THE EFFECTS OF DIGITAL CONTROL ON LONGITUDINAL AUTOPILOTS FOR BANK-TO-TURN AND SKID-TURN MISSILES M.S. Thesis

Ioannis C. Karaiskos Dec. 1985 140 p refs

(AD-A164507) Avail: NTIS HC A07/MF A01 CSCL 17/7

In the development, the classical design and analysis were reviewed using the continuous uncoupled pitch channel autopilot for circular airframe. Then, applying analog-to-digital conversion, the corresponding discrete autopilot was designed. The performance of both continuous and discrete open loop systems was analyzed according to the desired requirements. In the following section, utilizing modern control design techniques for the discrete pitch channel autopilot, the control law was designed, assuming availability of all the states and taking the desired poles to be at the same place as in the classical design. Therefore the discrete state-feedback autopilot was obtained and analyzed. The next step was the design of an estimator which estimates the entire state vector, given measurements of the portion of the state. The performance of the estimator was analyzed too. Finally coupling the discrete pitch and roll channel autopilots the overall performance of the discrete system was obtained and analyzed. The resulting design was also proved to be robust. GRA

N86-25396# Naval Postgraduate School, Monterey, Calif.

DESIGN AND ANALYSIS OF DISCRETE LATERAL AUTOPILOTS FOR COORDINATED BANK-TO-TURN MISSILES M.S. Thesis

Christos I. Karadimas Dec. 1985 165 p refs

(AD-A164518) Avail: NTIS HC A08/MF A01 CSCL 17/7

This thesis addresses the design and analysis of discrete lateral autopilots for application to BTT missiles. The first part reviews the classical design and analysis of the continuous uncoupled yaw and roll channels. Then, applying analog-to-digital conversion, the corresponding discrete autopilots were designed and analyzed in terms of their transient responses. The second part uses modern control design techniques for the single-input discrete lateral autopilots. At first, assuming availability of all states for feedback purposes, a discrete state-feedback autopilot is obtained. Next, since the state vector is not always available to direct measurement, an estimator is introduced to implement control. The state-feedback and estimator designs are analyzed for both lateral channels and found to have satisfactory time responses. Finally, coupling the

discrete pitch and roll channel autopilots, a state-feedback and estimator are designed and found to be robust. GRA

N86-25397# Department of the Army, Washington, D. C.
SPIN STABILIZED IMPULSIVELY CONTROLLED MISSILE (SSICM) Patent
James I. Crawford, inventor (to Army) and W. Max Howell, inventor (to Army) Issued 24 Dec. 1985 9 p
(AD-D012103; US-Patent-4,560,120; US-Patent-Appl-SN-524627; US-Patent-Class-244-3.22) Avail: US Patent and Trademark Office CSCL 16/4

This patent is for the Spin Stabilized Impulsively Controlled Missile (SSICM). SSICM is a missile configuration which employs spin stabilization, nutational motion, and impulsive thrusting, and a body mounted passive or semiactive sensor to achieve very small miss distances against a high speed moving target. SSICM does not contain an autopilot, control surfaces, a control actuation system, nor sensor stabilization gimbals. SSICM spins at a rate sufficient to provide frequency separation between body motions and inertial target motion. Its impulsive thrusters provide near instantaneous changes in lateral velocity, whereas conventional missiles require a significant time delay to achieve lateral acceleration. GRA

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N86-25398*# National Aeronautics and Space Administration, Washington, D.C.
AN OVERVIEW OF EUROPEAN SPACE TRANSPORTATION SYSTEMS
R. E. Lo Nov. 1985 31 p refs Transl. into ENGLISH of conf. paper "Europaeische Raumfahrt-Transportsysteme" presented at the DGLR Annual Conference, 1985 p 1-24 Conference held in Bad Godesberg, West Germany, 30 Sep. - 2 Oct. 1985 Transl. by The Corporate Word, Inc., Pittsburgh, Pa.
(Contract NASw-4006)
(NASA-TM-77683; NAS 1.15:77683; DGLR-85-100) Avail: NTIS HC A03/MF A01 CSCL 22A

With the completion of the launch rocket series Ariane 1 to 4, Europe will have reached the same capacity to transport commercial payloads as the USA has with the Space Shuttle and the kick stages which are presently operative. The near term development of these capacities would require Europe to develop a larger launch rocket, Araine 5. Further motivations for this rocket are access to manned spaceflight, the development of an European space station, and the demand for shuttle technology. Shuttle technology is the subject of research being done in France on the winged re-entry vehicle Hermes. Operation of the European space station Columbus will require development of an interorbital transport system to facilitate traffic between the various segments of the space station. All European space transportation systems will have to match their quality to that of the other countries involve in space flight. All areas of development are marked not only by possible cooperation but also by increased competition because of increasing commercialization of space flight. Author

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N86-25399# Massachusetts Inst. of Tech., Cambridge. Sea Grant College Program.
DESIGN AND PERFORMANCE ANALYSIS OF DIGITAL ACOUSTIC UNDERWATER TELEMETRY SYSTEM
J. A. Catipovic, A. B. Baggeroer, K. vonderHeydt, and D. E. Koelsch Nov. 1985 56 p refs
(Contract NA81AA-D-00069)
(PB86-156510; MITSG-85-12) Avail: NTIS HC A04/MF A01 CSCL 09E

The work discusses the design and performance characteristics of a Digital Acoustic Telemetry System (DATS) which incorporates the current state-of-the-art technology and is capable of reliable data transmission at rates useful to a wide range of ocean exploration and development gear. GRA

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N86-25400# Lawrence Livermore National Lab., Calif.
MaRV PENETRATION STUDY: A 2-D SIMULATION APPROACH
L. C. Ng 22 Nov. 1985 70 p
(Contract W-7405-eng-48)
(DE86-004493; UCID-20598) Avail: NTIS HC A04/MF A01

The performance assessment of a maneuverable re-entry vehicle (MaRV) in terms of its probability of penetration (POP) during re-entry and the subsequent circular error probability (CEP) at impact is a very complex problem. A thorough study of this problem will require the development of a number of analytical and simulation tools. This report summarizes the preliminary simulation development effort of the realism that can only come from a 3-D model, it nevertheless served as a good stepping stone in the study and development of the terminal engagement strategy from a conventional ballistic RV (BRV) to a MaRV system. DOE

N86-25401*# Alabama Univ., University. Environmental and Energy Center.
PERSONNEL OCCUPIED WOVEN ENVELOPE ROBOT Progress Report
F. C. Wessling 1 Jun. 1986 45 p refs
(Grant NAGw-847)
(NASA-CR-176832; NAS 1.26:176832) Avail: NTIS HC A03/MF A01 CSCL 22B

The use of nonmetallic or fabric structures for space application is considered. The following structures are suggested: (1) unpressurized space hangars; (2) extendable tunnels for soft docking; and (3) manned habitat for space stations, storage facilities, and work structures. The uses of the tunnel as a passageway: for personnel and equipment, eliminating extravehicular activity, for access to a control cabin on a space crane and between free flyers and the space station are outlined. The personnal occupied woven envelope robot (POWER) device is shown. The woven envelope (tunnel) acts as part of the boom of a crane. Potential applications of POWER are outlined. Several possible deflection mechanisms and design criteria are determined. E.A.K.

N86-25402# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
MODAL ASSIGNMENT EFFECTS ON DECENTRALIZED CONTROL OF A LARGE SPACE STRUCTURE M.S. Thesis
Jonathan B. Sumner Dec. 1985 158 p refs
(AD-A163977; AFIT/GA/AA/85D-9) Avail: NTIS HC A08/MF A01 CSCL 22/2

The more modes a designer can keep in the model of the system/space structure, the less inaccurate it will be. But the computational burden to an online computer, functioning as the controller, grows also. The thrust of this thesis is to implement time response output for the nontrivial model and investigate the effect on time response of certain modal assignments by fixed groups to any of the three controllers with another fixed group assigned as residuals. The inclusion of residuals provides in a limited sense a truth model for the analysis of stability and performance. There may be significant differences in time response caused by the fact that a controller is known to provide more relative controllability and less observability, or vice versa for its assigned modes. The investigation will involve initially the fixing of certain baseline parameters to allow a parallel comparison of reasonable results. Then line-of-sight pointing and defocus performance will be generated for comparison among various cases. The simulation model is a version of the so-called Draper-2 space structure model. The next section describes the selected model configuration and discusses its finite element representation. Then the modal control and matrix transformation methods will be explained. The implementation of the simulation program will be discussed. The last sections will detail the investigation, results, conclusions and recommendations. GRA

N86-25403# National Environmental Satellite Service, Washington, D. C.
PLAN FOR SPACE STATION POLAR-ORBITING PLATFORM Final Report
J. H. McElroy, S. R. Schneider, D. B. Miller, and J. W. Sherman, III Jun. 1985 105 p refs
(AD-A164405) Avail: NTIS HC A06/MF A01 CSCL 22/2

This ENVIROSAT-2000 Report concerns utilization of the polar platform component of NASA's Space Station program. Issues covered in the report include instrument payloads, altitudes, orbits, serviceability, communications, and data processing. A scenario is set forth for operational utilization of the platform, including issues surrounding integration of operational and research missions. The discussion is broken down by discipline: oceanography, meteorology, land sciences, atmospheric sciences, and solar-terrestrial investigations. A cost analysis shows that performing NOAA operations from the polar platforms would prove extremely beneficial by replacing the expendable two Polar-orbiting Operational Environmental Satellite (POES) system that NOAA now maintains. GRA

N86-25404# New Mexico State Univ., Las Cruces. Physical Science Lab.
SHARP (STABILIZED HIGH ALTITUDE RESEARCH PLATFORM) Final Technical Report, Jul. 1983 - Aug. 1985
Sep. 1985 18 p refs
(Contract F19628-81-C-0127)
(AD-A164459; SD-838-1108; AFGL-TR-85-0056) Avail: NTIS HC A02/MF A01 CSCL 01/3

The Stabilized High Altitude Research Platform (SHARP) is a balloon-borne payload separable into two structures. The lower section, which is recoverable in mid-air, carries a gyroscopically-stabilized platform designed to stare at or scan an area on or above the Earth's surface. Commands from the ground define the target or type of motion required. GRA

N86-25619# Joint Publications Research Service, Arlington, Va.
MOTION OF SATELLITE RELATIVE TO CENTER OF MASS CAUSED BY MOMENTS OF LIGHT-PRESSURE FORCES Abstract Only
D. D. Leshchenko and A. S. Shamayev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 60 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 14-21 Original language document was announced in IAA as A85-28902 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25620# Joint Publications Research Service, Arlington, Va.
DYNAMICS OF ORIENTING AND STABILIZING SYSTEMS FOR SPACECRAFT WITH CONTROLLABLE GRAVITATIONAL STABILIZER Abstract Only
Ye. M. Potapenko *In its* USSR Report: Engineering and Eduction (JPRS-UEQ-86-002) 7 Feb. 1986 p 69-70 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 22-30 Original language document was announced in IAA as A85-28903 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25621# Joint Publications Research Service, Arlington, Va.
CORRECTION OF SPACE TACHOMETER - STABILIZING GYRO SYSTEM Abstract Only
A. I. Tkachenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 70 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 31-36 Original language document was announced in IAA as A85-28904 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

N86-25405# Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
OFFICE OF NAVAL RESEARCH PUBLICATIONS, PATENTS, PRESENTATIONS, HONORS REPORT Report, 1 Oct. 1983 - 30 Sep. 1985
Donald A. Gurnett 30 Sep. 1985 6 p refs
(Contract N00014-82-K-0183)
(AD-A164343) Avail: NTIS HC A02/MF A01 CSCL 03/2

This is a list of papers, etc., on the Plasma Wave Instrument on the AMPTE/IRM Spacecraft. Each entry, of which there are 12, lists authors, titles of articles, journals and conferences. GRA

N86-25406# Naval Postgraduate School, Monterey, Calif.
DESIGN OF A SPACE BASED SENSOR TO PREDICT THE INTENSITY AND LOCATION OF EARTHQUAKES FROM ELECTROMAGNETIC RADIATION M.S. Thesis
Michael L. Whyms Dec. 1985 84 p refs
(AD-A164357) Avail: NTIS HC A05/MF A01 CSCL 08/11

A proposed design for a space-based sensor to predict and detect earthquakes is presented. A free standing radiofrequency noise measurement and recording system is described to research the correlation between earthquakes and increased background electromagnetic noise at 30.45 MHz and 150.75 MHz. GRA

N86-25526# Joint Publications Research Service, Arlington, Va.
AUTOMATED MULTIDIMENSIONAL ANALYZER BASED ON SM-3 KAMAK Abstract Only
R. Kupchak, A. Soltan, N. K. Skobelev, M. Levitovich, A. Yankovski, and G. Baluka *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 1-2 refs Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow), no. 2, Mar.-Apr. 1985 p 203-206 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

N86-25527# Joint Publications Research Service, Arlington, Va.
SELECTIVE COATINGS FOR SOLAR-TO-THERMAL ENERGY CONVERTERS Abstract Only
M. I. Umarova *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 20 refs Transl. into ENGLISH from Izv. Akad. Nauk Tadzhiksoy SSR Otd. Fiz.-Mat., Fiz. i Geol. Nauk (USSR), no. 2 (92), Apr. - Jun. 1984 p 61-71 Previously announced as N85-28144 (For primary document see

N86-25525 16-31)
Avail: NTIS HC A06/MF A01

N86-25622# Joint Publications Research Service, Arlington, Va.
HARMONIC VIBRATIONS OF VISCOELASTIC SHELLS OF PIEZOCERAMIC MATERIAL WITH ATTENDANT HEATING Abstract Only
V. G. Karnaukhov and I. F. Kirichok *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-82-006) 7 Feb. 1986 p 71 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 21, no. 2, Feb. 1985 p 60-67 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N86-25407*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LOWER POWER dc ARCJET OPERATIONS WITH HYDROGEN HYDROGEN/NITROGEN PROPELLANT MIXTURES
Francis M. Curran and Shigeo Nakanishi (Analex Corp., Cleveland, Ohio) 1986 23 p refs Presented at 22nd Joint Propulsion Conference, Huntsville, Ala., 16-18 Jun. 1986; sponsored by AIAA, ASME, SAE and American Society for Ecological Education
(NASA-TM-87279; E-2982; NAS 1.15:87279) Avail: NTIS HC A02/MF A01 CSCL 21H

The arcjet assembly from a flight model system was modified with a new thoriated tungsten nozzle insert and has been tested with hydrogen-nitrogen mixtures simulating the decomposition products of ammonia and hydrazine. Arcjet power consumption ranged from 0.7 to 1.15 kW depending on low rate, input current, and mixture composition. At a nominal 1 kW power level the ammonia mixtures thrust efficiency was about 0.31 at specific impulse values ranging between 460 and 500 sec. Hydrazine mixtures gave similar thrust efficiencies at the same power level with specific impulse values between 395 and 430 sec. Large, spontaneous voltage mode changes were not observed once the thruster had passed a period of instability immediately following start up. This period of instability, and the startup at low pressure, were seen as major causes of constrictor damage during the tests. Author

N86-25408*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
STRUCTURAL INTEGRITY AND DURABILITY FOR SPACE SHUTTLE MAIN ENGINE AND FUTURE REUSABLE SPACE PROPULSION SYSTEMS
Stanley J. Marsik and Henry T. Gawrylowicz 1986 18 p refs Presented at the 22nd Joint Propulsion Conference, Huntsville, Alabama, 16-18 Jun. 1986; sponsored by AIAA, ASME, SAE, and ASEE
(NASA-TM-87280; E-2983; NAS 1.15:87280) Avail: NTIS HC A02/MF A01 CSCL 21H

NASA is conducting a program which will establish a technology base for the orderly evolution of reusable space propulsion systems. As part of that program, NASA initiated a Structural Integrity and Durability effort for advanced high-pressure oxygen-hydrogen rocket engine technology. That effort focuses on the development of: (1) accurate analytical models to describe flow fields; aerothermodynamic loads; structural responses; and fatigue/fracture, from which life prediction codes can be evolved; and (2) advanced instrumentation with capabilities to verify the codes in an SSME-like environment as well as the potential for future use as diagnostic sensors for real-time condition monitoring of critical engine components. Author

N86-25409*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
POWER ELECTRONICS FOR A 1-KILOWATT ARC JET THRUSTER
Robert P. Gruber 1986 23 p refs Presented at the 22nd Joint Propulsion Conference, Huntsville, Ala., 16-18 Jun. 1986; sponsored by AIAA, ASME, SAE and ASEE
(NASA-TM-87340; E-3089; NAS 1.15:87340) Avail: NTIS HC A02/MF A01 CSCL 21H

After more than two decades, new space mission requirements have revived interest in arcjet systems. The preliminary development and demonstration of new, high efficiency, power electronic concepts for start up and steady state control of dc arcjets is reported. The design comprises a pulse width modulated power converter which is closed loop configured to give fast current control. An inductor, in series with the arcjet, serves the dual role of providing instantaneous current control, as well as a high voltage arc ignition pulse. Benchmark efficiency, transient response, regulation, and ripple data are presented. Tests with arcjets demonstrate that the power electronics breadboard can start thrusters consistently with no apparent damage and transfer reliably to the nondestructive high voltage arc mode in less than a second. Author

N86-25410# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ACTA ARMAMENTARII (SELECTED ARTICLES)
Yanhuang Zhou, Xingchang Sun, Hebao Yin, Xingquan Chen, and Guang Li 23 Jan. 1986 33 p refs Transl. into ENGLISH from Binggong Xuebao (China), no. 4, Nov. 1984 p 11-14
(AD-A164313; FTD-ID(RS)T-0907-85) Avail: NTIS HC A03/MF A01 CSCL 21/8

This journal presents foreign technology articles from China. Some titles are: Study of the Effect of Particle Density and Particle Size in a Gas-Solid Flow on the Drag Coefficient; and, A New Method of Rocket Nozzle Design. E.R.

N86-25411# Naval Postgraduate School, Monterey, Calif.
BOOST CONTROL DESIGN FOR SPINNING MISSILE M.S. Thesis
Richard L. Park, Jr. Dec. 1985 97 p refs
(AD-A164505) Avail: NTIS HC A05/MF A01 CSCL 16/4

A compensation scheme is presented for the pitch-yaw control system of a strategic missile which maintains stability and performance while the missile spins. The conventional missile control design for boost has uncoupled pitch, yaw and roll channels ideally suited for a non-rolling missile. The effect roll has on the conventional pitch-yaw controller is discussed and the development and simulation of a modified system is presented. GRA

N86-25412# Department of the Air Force, Washington, D.C.
PULSED INTEGRAL ROCKET Patent Application
Nagy, inventor (to Air Force) Filed 21 Oct. 1985 13 p
(AD-D012138; US-Patent-Appl-SN-789864) Avail: NTIS HC A02/MF A01 CSCL 21/8

The prevention of over-acceleration of air-launched air-breathing missiles which are boosted by a solid fueled rocket is accomplished by replacing the solid fueled rocket with a two-section solid motor arrangement designed for a choice between simultaneous burning and sequential burning. When a host aircraft is flying at relatively low velocities, the two-section motors should be fired simultaneously to boost the ramjet of the air-breathing missile to operational velocities (Mach 3 to Mach 5). When the host aircraft is flying at relatively high velocities, the two-section motors should be fired sequentially to avoid over-acceleration and extend the operational range of the missile. While the ramjet and the two-section rocket motor may all be housed in the same casing, they must be separated from each other by thermal insulation and must have their own igniter which is controlled separately. GRA

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N86-25413*# National Aeronautics and Space Administration, Washington, D.C.
DICARBOXYLIC ACID ANHYDRIDE CONDENSATION WITH COMPOUNDS CONTAINING ACTIVE METHYLENE GROUPS. 4: SOME 4-NITROPHTHALIC ANHYDRIDE CONDENSATION REACTIONS
V. Oskaja and J. Rotberg Sep. 1985 14 p refs Transl. into ENGLISH from Latvijas PSR Zinatnu Akad. Vestis, Kimijas Serija, LZAKAM, no. 1, 1967 p 63-69 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-4005)
(NASA-TM-77918; NAS 1.15:77918) Avail: NTIS HC A02/MF A01 CSCL 07A

By 4-nitrophthalic anhydride condensation with acetoacetate in acetic anhydride and triethylamine solution with subsequent breakdown of the intermediate condensation product, 5-nitroindandedione-1,3 was obtained. A 4-nitrophthalic anhydride with acetic anhydride, according to reaction conditions, may yield two products: in the presence of potassium acetate and at high temperatures 4-(or 5-)-nitro-2-acetylbenzoic acid is formed: in the presence of triethylamine and at room temperature 5-(or 6-)-nitrophthalic acetic acid is isolated. A 4-nitrophthalic anhydride and malonic acid in pyridine solution according to temperature yield either 5-(or 6-)-nitrophthalic acetic acid or 4-(or 5-)-nitro-2-acetylbenzoic acid.
Author

N86-25414# Puerto Rico Univ., Rio Piedras.
THE SYNTHESIS AND ORGANIC CHEMISTRY OF THE BORON-SILICON BOND Final Report, 1 Oct. 1980 - 30 Sep. 1985
Gerald L. Larson 12 Dec. 1985 7 p refs
(Grant DAAG29-80-G-0008)
(AD-A164073; ARO-17858.1-CH-H) Avail: NTIS HC A02/MF A01 CSCL 07/3

The synthesis of the boron-silicon bond via the reaction of methyldiphenylsilyllithium with 9-borabicyclo 3.3.1 nonane and treatment of the hydridoborate complex with acid was accomplished. The B-silyl-9-BBN was difficult to separate and purify, but was nevertheless fully characterized. It showed very little reactivity, however. For example, it oxidized well with alkaline hydrogen peroxide and slowly in air, but was inert to methanol, water, bromine and tributyltin hydride. In addition it did not react with carbonyl compounds, nor with olefins or acetylenes under a variety of conditions. The reaction of silyllithium reagents with 9-BBN in the presence of N,N,N',N'-tetramethylethylenediamine produced the corresponding borate in excellent yield as judged by 11B NMR analysis. These systems too were very unreactive, reacting well only with unhindered alcohols and very poorly with aldehydes and even acid chlorides. Attempts to prepare a stable, crystalline amine complex were unsuccessful.
GRA

N86-25415# Puerto Rico Univ., Rio Piedras. Dept. of Chemistry.
PHASE TRANSFER HYDROLYSIS OF ALKYL AND ACYL HALIDES AD-A164254 ARO-17861.4-CH HC A04/MF A01 Final Report, 29 Sep. 1980 - 31 Dec. 1984
H. Dupont Durst 1 Nov. 1985 52 p refs
(Grant DAAG29-80-G-0015)
(AD-A164254; ARO-17861.4-CH) Avail: NTIS HC A04/MF A01 CSCL 07/3

This proposal describes the design of a co-catalytic phase transfer catalytic system for the hydrolysis of alkyl and acyl halides. This system is designed to function in a non-aqueous organic phase in contact with a non-mixing basic aqueous phase. The mechanism of action of the system is the phase transferred nucleophilic displacement of the halide by the carboxylate anion followed by the intramolecular lactone formation and subsequent hydrolysis. The rapid conversion of alkyl halides into alcohols is in effect a detoxification reaction. Results show that the use of commercially available phase transfer catalysts and lactones enhance the hydrolysis, as predicted, as well as the observation of a peculiar cation ($K+ > Na+$) effect on hydrolysis rate. Hydrolysis of acyl (and phosphoryl) halides is difficult to quantify using the ptc system. Results indicate the co-catalytic lactone system most useful against alkyl halides (e.g., mustard); however the rate enhancements are not extraordinary. A synthetic study was initiated to design more effective ptc agents. Lariat ethers (modified crown ethers) show enhanced binding and possible novel reaction modes.
GRA

N86-25545# Joint Publications Research Service, Arlington, Va.
THE STRUCTURE OF ZSM-5 MOLECULAR SIEVES AT HIGH TEMPERATURE Abstract Only
Zhenyi Liu, Wanjing Zhang, Bingxiong Lin, Wei Zhu et al *In* China Report: Science and Technology (JPRS-CST-86-001) 17 Jan. 1986 p 86 Transl. into ENGLISH from Ranliao Huaxue Xuebao (Taiyuan, China), v. 13, no. 2, Jun. 1985 p 106-113 (For primary document see N86-25539 16-31)
Avail: NTIS HC A06/MF A01

24 COMPOSITE MATERIALS

Includes laminates.

N86-25416* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
LAMINATE COMPRISING FIBERS EMBEDDED IN CURED AMINE TERMINATED BIS-IMIDE Patent
Devendra Kumar, inventor (to NASA) (National Academy of Sciences - National Research Council, Washington, D. C.), George M. Fohlen, inventor (to NASA), and John A. Parker, inventor (to NASA) Issued 1 Apr. 1986 7 p Filed 30 Aug. 1985 Sponsored by NASA
(NASA-CASE-ARC-11421-3; US-Patent-4,579-782;
US-Patent-Appl-SN-771538; US-Patent-Class-428-473.5;
US-Patent-Class-428-474.4; US-Patent-Class-428-477.7;
US-Patent-Class-528-170; US-Patent-Class-528-220;
US-Patent-Class-528-321; US-Patent-Class-528-322) Avail: US Patent and Trademark Office CSCL 11D

Amine terminated bisaspartimides are prepared by a Michael type reaction of an aromatic bismaleimide and an aromatic diamine in an aprotic solvent. These bisaspartimides are thermally polymerized to yield tough, resinous polymers crosslinked through -NH- groups. Such polymers are useful in applications requiring materials with resistance to change at elevated temperatures.
NASA

N86-25417*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FRACTURE CHARACTERISTICS OF ANGLEPLIED LAMINATES FABRICATED FROM OVERAGED GRAPHITE/EPOXY PREPREG
Carol A. Ginty and Christos C. Chamis 1985 22 p refs Presented at Symposium on Fractography of Modern Engineering Materials, Nashville, Tenn., 18-19 Nov. 1985; Sponsored by American Society for Testing and Materials
(NASA-TM-87266; E-2968; NAS 1.15:87266) Avail: NTIS HC A02/MF A01 CSCL 11D

A series of angleplied graphite/epoxy laminates was fabricated from overaged prepreg and tested in tension to investigate the effects of overaged or advanced cure material on the degradation of laminate strength. Results, which include fracture stresses, indicate a severe degradation in strength. In addition, the fracture surfaces and microstructural characteristics are distinctly unlike any features observed in previous tests of this prepreg and laminate configuration. Photographs of the surfaces and microstructures reveal flat morphologies consisting of alternate rows of fibers and hackles. These fracture surface characteristics are independent of the laminate configurations. The photomicrographs are presented

and compared with data from similar studies to show the unique characteristics produced by the overage prepreg. Analytical studies produced results which agreed with those from the experimental investigations. Author

N86-25418# Brookhaven National Lab., Upton, N. Y.
LIGHTWEIGHT POLYMER CONCRETE COMPOSITES
J. J. Fontana, M. Steinberg, and W. Reams Aug. 1985 17 p Presented at the American Concrete Institute Conference, Chicago, Ill., 29 Sep. - 4 Oct. 1985
(Contract DE-AC02-76CH-00016)
(DE86-001734; BNL-37024; CONF-8509186-1) Avail: NTIS HC A02/MF A01

Lightweight polymer concrete composites have been developed with excellent insulating properties. The composites consist of lightweight aggregates such as expanded perlites, multicellular glass nodules, or hollow alumina silicate microspheres bound together with unsaturated polyester or epoxy resins. These composites, known as Insulating Polymer Concrete (IPC), have thermal conductivities from 0.09 to 0.19 Btu/h-ft-(0)F. Compressive strengths, dependent upon the aggregates used, range from 1000 to 6000 psi. These materials can be precast or cast-in-place on concrete substrates. Recently, it has been demonstrated that these materials can also be sprayed onto concrete and other substrates. An overlay application of IPC is currently under way as dike insulation at an LNG storage tank facility. The composites have numerous potentials in the construction industry such as insulating building blocks or prefabricated insulating wall panels. DOE

N86-25419*# Washington Univ., St. Louis, Mo. Center for Composites Research.
COMPRESSION FAILURE MECHANISMS OF COMPOSITE STRUCTURES Final Report, 1 Aug. 1982 - 31 Jul. 1985
H. Thomas Hahn, Mohsen Sohi, and Suresh Moon Washington NASA Jun. 1986 117 p refs
(Grant NAG1-295)
(NASA-CR-3988; NAS 1.26:3988; WU/CCR-85/5) Avail: NTIS HC A06/MF A01 CSCL 11D

An experimental and analytical study was conducted to delineate the compression failure mechanisms of composite structures. The present report summarizes further results on kink band formation in unidirectional composites. In order to assess the compressive strengths and failure modes of fibers themselves, a fiber bundle was embedded in epoxy casting and tested in compression. A total of six different fibers were used together with two resins of different stiffnesses. The failure of highly anisotropic fibers such as Kevlar 49 and P-75 graphite was due to kinking of fibrils. However, the remaining fibers--T300 and T700 graphite, E-glass, and alumina--failed by localized microbuckling. Compressive strengths of the latter group of fibers were not fully utilized in their respective composite. In addition, acoustic emission monitoring revealed that fiber-matrix debonding did not occur gradually but suddenly at final failure. The kink band formation in unidirectional composites under compression was studied analytically and through microscopy. The material combinations selected include seven graphite/epoxy composites, two graphite/thermoplastic resin composites, one Kevlar 49/epoxy composite and one S-glass/epoxy composite. Author

N86-25420*# National Aeronautics and Space Administration, Washington, D.C.
MANUFACTURE OF SINTERED SILICON NITRIDES
T. Iwai Oct. 1985 10 p Transl. into ENGLISH from Japanese Patent no. 5988373 (Appl. no. 58169291, 23 Apr. 1981) p 1-3 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-4005)
(NASA-TM-77927; NAS 1.15:77927) Avail: NTIS HC A02/MF A01 CSCL 11D

Sintered silicon nitrides are manufactured by sintering Si3N powder containing 2 to 15% in wt of a powder mixture composed of nitride powder of lanthanide or Y 100 parts and AlN powder less than 100 parts at 1500 to 1900 deg. temperature under a pressure of less than 200 Kg/sq. cm. The sintered Si3N has high mechanical strength in high temperature. Thus, Si3N4 93.0, Y 5.0 and AlN 2.0% in weight were wet mixed in acetone in N atom, molded and sintered at 1750 deg. and 1000 Kg/sq. cm. to give a sintered body having high hardness. Author

N86-25421# Naval Postgraduate School, Monterey, Calif.
A COMPARISON OF TWO METHODS FOR FIBER DIAMETER MEASUREMENT AND A SYSTEM DESIGN FOR THE STUDY OF COMPOSITE RELIABILITY M.S. Thesis
Thomas A. Bennett Dec. 1985 73 p refs
(AD-A164355) Avail: NTIS HC A04/MF A01 CSCL 11/4

This thesis involves the design and construction of an integrated fiber diameter measurement and strength test system for the purpose of conducting a study of the reliability of a composite material. The emphasis of this thesis is placed on the comparison of two methods of fiber diameter measurement using the light diffraction pattern formed by the obstruction of a laser beam by a fiber sample. GRA

N86-25422# California Univ., San Diego, La Jolla. Dept. of Applied Mechanics and Engineering.
A COMPOSITE PLATE THEORY FOR ARBITRARY LAMINATE CONFIGURATIONS Technical Report, Jul. 1984 - Dec. 1985
A. Toledano and H. Murakami Dec. 1985 35 p refs
(Contract N00014-84-K-0468)
(AD-A164370) Avail: NTIS HC A03/MF A01 CSCL 11/7

In order to improve the accuracy of in-plane responses of shear deformable composite plate theories, a new laminated plate theory was developed for arbitrary laminate configuration based upon Reissner's (1984) new mixed variational principle. To this end, across each individual layer, piecewise linear continuous displacements and quadratic transverse shear stress distributions were assumed. The accuracy of the present theory was examined by applying it to the cylindrical bending problem of laminated plates which had been solved exactly by Pagano (1969). A comparison with the exact solutions obtained for symmetric, antisymmetric and arbitrary laminates indicates that the present theory acurately estimates in-plane responses, even for small span-to-thickness ratios. Author (GRA)

N86-25423# California Univ., San Diego. Dept. of Applied Mechanics and Engineering.
A HIGH-ORDER MIXTURE MODEL FOR PERIODIC PARTICULATE COMPOSITES Technical Report, Jul. 1984 - Dec. 1985
A. Toledano and H. Murakami Dec. 1985 32 p refs
(Contract N00014-84-K-0468)
(AD-A164389) Avail: NTIS HC A03/MF A01 CSCL 11/4

A deterministic mixture theory is presented for periodic particulate composites. The model is constructed by introducing convenient microdisplacement and microstress variables and by using a regular asymptotic technique with multiple scales. Governing equations and appropriate boundary conditions are then deduced from Ressiner's mixed variational principle (1950). In order to test the accuracy of the present model, harmonic wave propagation is examined and compared with available experimental data for Glass/Epoxy and Steel/PMMA composites reported by Kinra and Ker (1983). Also, the effective elastic moduli are computed, and the results compared with other analytical methods. GRA

N86-25424# Dyna East Coast Corp., Philadelphia, Pa.
CUMULATIVE DAMAGE MODEL FOR ADVANCED COMPOSITE MATERIALS Final Technical Report, Aug. 1983 - Apr. 1985
A. S. D. Wang, Pei Chi Chou, Charles S. Lei, and Ronald B. Bucinell 15 Oct. 1985 278 p refs
(Contract F33615-80-C-4104)
(AD-A164392; AFWAL-TR-85-4104) Avail: NTIS HC A13/MF A01 CSCL 11/4

This report represents the details of a methodology in which cumulative damage in composite laminates is mathematically modeled. The basic concept adopted in the theoretical development is to regard the accumulation of damage in laminates as a

load and/or time dependent process. The process begins with the initiation of sublaminate cracks at locations where dominating material flaws exist. Under a sustaining load, the requirement of the model is to be able to describe the process as a function of loading history. In this research program, the cumulative damage model is developed from five stages of effort: numerical, experimental, theorization, simulation, and prediction/correlation. GRA

N86-25425# California Univ., San Diego. Dept. of Applied Mechanics and Engineering.
A HIGH-ORDER LAMINATED PLATE THEORY WITH IMPROVED IN-PLANE RESPONSES Technical Report, Jul. 1984 - Dec. 1985
A. Toledano and H. Murakami Dec. 1985 39 p refs
(Contract N00014-84-C-0468)
(AD-A164396) Avail: NTIS HC A03/MF A01 CSCL 11/4

In order to improve the accuracy of the in-plane responses of the shear deformable laminated composite plate theories, a new high-order laminated plate theory was developed based upon Reissner's new mixed Variational Principle. To this end, a zig-zag shaped C sub 0 function and Legendre polynomials were introduced into the approximate in-plane displacement distributions across the plate thickness. The accuracy of the present theory was examined by applying it to the cylindrical bending problem of laminated plates which had been solved exactly by Pagano. A comparison with the exact solutions obtained for several symmetric and asymmetric cross-ply laminates indicates that the present theory accurately estimates in-plane responses, even for small span-to-thickness ratio. Author (GRA)

N86-25426# Naval Postgraduate School, Monterey, Calif.
AN ANALYSIS OF SYMMETRIC REINFORCEMENT OF GRAPHITE/EPOXY HONEYCOMB SANDWICH PANELS WITH A CIRCULAR CUTOUT UNDER UNIAXIAL COMPRESSIVE LOADING
Patrick D. Sullivan Dec. 1985 343 p refs
(AD-A164490; AD-E900539) Avail: NTIS HC A15/MF A01 CSCL 11/4

An experimental and computational analysis was made of stress/strain concentrations around a reinforced circular 1.00 inch diameter circular cutout in HMF330C/34 (cloth) graphite/epoxy (G/Ep) and fiberglass/phenolic honeycomb sandwich panels under uniaxial compressive loading. The test specimens were 10.00 in. x 8.50 in., eight ply quasi-isotropic panels. The reinforcement consisted of either one or two additional G/Ep plies co-cured to the outside of each facesheet. Three general reinforcement configurations were considered: round, square and strips parallel to the applied load. The analytical results demonstrated that small amounts of reinforcement could greatly increase the strength-to-weight ratio. The indication was that concentrating the reinforcement close to the cutout yielded the greatest decrease in stress concentration. A computer program of experimental validation of the analytical results experienced some problems with premature panel failure caused by the facesheets separating from the core. It generally confirmed the analytical results, however. Further experimental tests on promising reinforcement configurations are justified based on these results. Properly designed reinforcement around cutouts in composite panels can significantly reduce the stress concentration and holds the promise of far lighter and stronger aerospace structures. Author (GRA)

N86-25427 Iowa Univ., Iowa City.
ANALYTICAL AND EXPERIMENTAL STUDY ON MICROPOLAR ELASTIC BEHAVIOR IN COMPOSITE MATERIALS Ph.D. Thesis
Hyun Chul Park 1985 154 p
Avail: Univ. Microfilms Order No. DA8527992

Micropolar elastic behavior of composite materials was investigated analytically and experimentally. A boundary value problem of torsion of a prismatical bar of square cross sections of a micropolar elastic solid was solved analytically and shear strain was computed as a function of position on the lateral surfaces of the bar based on the analytic solution. Warping of the square cross section was found to differ from the warp in the classically elastic solid. Contrary to the classical case, a nonzero shear strain was predicted to occur at the edge of the bar. Elastic shear strain was measured by means of strain gage rosette on the surface of human femoral compact bone as a function of position subjected to twisting moment. The torsional creep of human compact bone was performed while immersed in Ringer's solution. In the study of elastic modulus of bone particle impregnated PMMA, the modulus of elasticity was measured experimentally. The results showed that the modulus increased with bone particle concentration. Dissert. Abstr.

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N86-25428* National Aeronautics and Space Administration. Pasadena Office, Calif.
SOLAR HEATED OIL SHALE PYROLYSIS PROCESS Patent
Shaik A. Qader, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena) Issued 15 Apr. 1985 7 p Filed 23 Jul. 1984 Sponsored by NASA
(NASA-CASE-NPO-16392-1; US-Patent-4,582,590;
US-Patent-Appl-SN-633363; US-Patent-Class-208-11;
US-Patent-Class-48-197-R; US-Patent-Class-8-DIG.9) Avail: US Patent and Trademark Office CSCL 07D

An improved system for recovery of a liquid hydrocarbon fuel from oil shale is presented. The oil shale pyrolysis system is composed of a retort reactor for receiving a bed of oil shale particules which are heated to pyrolyis temperature by means of a recycled solar heated gas stream. The gas stream is separated from the recovered shale oil and a portion of the gas stream is rapidly heated to pyrolysis temperature by passing it through an efficient solar heater. Steam, oxygen, air or other oxidizing gases can be injected into the recycle gas before or after the recycle gas is heated to pyrolysis temperature and thus raise the temperature before it enters the retort reactor. The use of solar thermal heat to preheat the recycle gas and optionally the steam before introducing it into the bed of shale, increases the yield of shale oil. B.G.

N86-25429*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MASS SPECTROMETRIC GAS COMPOSITION MEASUREMENTS ASSOCIATED WITH JET INTERACTION TESTS IN A HIGH-ENTHALPY WIND TUNNEL
Beverley W. Lewis, Kenneth G. Brown (Old Dominion Univ., Norfolk, Va.), George M. Wood, Jr., Richard L. Puster, Patricia A. Paulin, Charles E. Fishel, and D. Alan Ellerbe Jun. 1986 33 p refs
(NASA-TM-87642; L-16074; NAS 1.15:87642) Avail: NTIS HC A03/MF A01 CSCL 07D

Knowledge of test gas composition is important in wind-tunnel experiments measuring aerothermodynamic interactions. This paper describes measurements made by sampling the top of the test section during runs of the Langley 7-Inch High-Temperature Tunnel. The tests were conducted to determine the mixing of gas injected from a flat-plate model into a combustion-heated hypervelocity test stream and to monitor the CO2 produced in the combustion. The Mass Spectrometric (MS) measurements yield the mole fraction of N2 or He and CO2 reaching the sample inlets. The data obtained for several tunnel run conditions are related to the pressures measured in the tunnel test section and at the MS ionizer inlet. The apparent distributions of injected gas species and tunnel gas (CO2) are discussed relative to the sampling techniques. The measurements provided significant real-time data for the distribution of injected gases in the test section. The jet N2 diffused readily from the test stream, but the jet He was mostly entrained. The

amounts of CO2 and Ar diffusing upward in the test section for several run conditions indicated the variability of the combustion-gas test-stream composition. Author

N86-25430# Mound Lab., Miamisburg, Ohio.
ANALYSIS OF HYDROGEN GETTER MIXTURES
D. W. Firsich and R. O. Yelton 1985 3 p Presented at the 13th Department of Energy (DOE) Compability Meeting, 1985
(Contract DE-AC04-76DP-00053)
(DE86-003450; MLM-3311(OP); CONF-8510232-3) Avail: NTIS HC A02/MF A01

Acetylenic compounds are used to scavenge hydrogen in some weapons applications. Such compounds are screened for their suitability by reacting them with hydrogen and analyzing the products. Sometimes the reactions produce an oily product, an undesirable result because of the contamination potential of an oil. DD-31 and MTU-9 are the names of mixtures which are products of the type of screening test mentioned above. DD-31 and MTU-9 were produced at Sandia; the former is solid in appearance, while the latter is an oily mixture. The object of this study was to rationalize the different physical states of these mixtures, and to identify as many of the components as possible in each sample. In addition to structural characterization, it was desirable to determine whether each component was a solid or an oil. DOE

N86-25431*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
IGNITION DELAY TIMES OF BENZENE AND TOLUENE WITH OXYGEN IN ARGON MIXTURES
Alexander Burcat (Israel Inst. of Tech., Haifa.), Christopher Snyder, and Theodore Brabbs May 1985 15 p refs
(NASA-TM-87312; E-3041; NAS 1.15:87312) Avail: NTIS HC A02/MF A01 CSCL 20B

The ignition delay times of benzene and toluene with oxygen diluted in argon were investigated over a wide range of conditions. For benzene the concentration ranges were 0.42 to 1.69 percent fuel and 3.78 to 20.3 percent oxygen. The temperature range was 1212 to 1748 K and the reflected shock pressures were 1.7 to 7.89 atm. Statistical evaluation of the benzene experiments provided an overall equation which is given. For toluene the concentration ranges were 0.5 to 1.5 percent fuel and 4.48 to 13.45 percent oxygen. The temperature range was 1339 to 1797 K and the reflected shock pressures were 1.95 to 8.85 atm. The overall ignition delay equation for toluene after a statistical evaluation is also given. Detailed experimental information is provided. Author

N86-25432*# National Aeronautics and Space Administration, Washington, D.C.
METHOD FOR PRODUCING TETRAPHENOXIDE-N-ANILOXY CYCLO PHOSPHAZOTRIENE
Ye. I. Khofbauer and V. G. Kolesnikov May 1986 6 p Transl. into ENGLISH from Russian Patent no. 320498 (24 Jan. 1972) 6 p Transl. by The Corporate Word, Inc., Pittsburgh, Pa.
(Contract NASw-4006)
(NASA-TM-88430; NAS 1.15:88430) Avail: NTIS HC A02/MF A01 CSCL 07D

A method for producing tetraphenoxide-n-aniloxy cyclophosphazotriene, distinguished by the fact that tetraphenoxide dichlorocyclophosphazotriene is processed with an alkaline metal n-acetamidophenolate in an organic solvent, for example pyridine, during heating, after which the resulting compound is saponified in the presence of a mineral or organic acid, for example, hydrochloric, and the desired product separated by well known techniques. Author

N86-25433# Morgan State Univ., Baltimore, Md.
MOSSBAUER INVESTIGATION OF INTERMETALLIC HYDRIDES Final Report, 1 Nov. 1982 - 31 Oct. 1985
Frederick W. Oliver and Windsor Morgan 21 Dec. 1985 6 p refs
(Grant DAAG29-83-G-0001)
(AD-A163762; ARO-19957.3-PH-H) Avail: NTIS HC A02/MF A01 CSCL 07/4

This research was a study of hydrogen absorption in intermetallic hydrides. Mossbauer and X-ray diffraction measurements were used to aid in a determination of the hydrogen absorbing mechanism occurring in hydriding. Information was sought which would provide insight into the nature of bonding and interaction between the absorbed hydrogen and the various sites in the intermetallics. We were also interested in observing what happened to Sn in intermetallic compounds when hydrided. Studies were made of the changes in isomer shift and linewidth upon hydriding. GRA

N86-25434# Polytechnic Inst. of New York, Farmingdale. Dept. of Chemistry.
INFRARED AND ULTRASONIC SPECTRA OF SODIUM THIOCYANATE AND LITHIUM THIOCYANATE IN TETRAHYDROFURAN
D. Saar and S. Petrucci Jan. 1986 29 p refs
(Contract DAAG29-85-K-0051)
(AD-A163765; ARO-21758.4-CH) Avail: NTIS HC A03/MF A01 CSCL 07/4

Infrared spectra of sodium thiocyanate solutions and of lithium thiocyanate solutions in tetrahydrofuran (THF) in the wavenumber range 2000 to 2200/cm are reported. The digitized spectral envelope, which is due to the out of phase stretch of the SCN anion, is quantitatively described by the sum of three Gaussian-Lorentzian product functions. The three spectral bands are assigned respectively to the N-bonded pairs (approx. 2057/cm for NaNCS, approx. 2064/cm for LiNCS), to the dimers or quadrupoles (approx. 2043/cm for (NaNCS)2), 2040/cm for (LiNCS)2, and tentatively to triple ions (2074/cm for sodium thiocyanate, approx. 2086/cm for lithium thiocyanate). The maximum absorbances per unit length of cell are expressed as a function of concentrations by cubic polynomial functions. Ultrasonic spectra for sodium thiocyanate solutions in the THF in the frequency range 0.5 to 400 MHz are described by the sum of two Debye relaxation functions. For lithium thiocyanate solutions in the THF, the ultrasonic spectra are described by a single Debye relaxation function. GRA

N86-25435# University of Southern California, Los Angeles. Dept. of Mechanical Engineering.
TRANSIENT COMBUSTION DYNAMICS Final Report, 1 Jun. 1982 - 31 May 1985
P. R. Choudhury, Melvin Gerstein, and Reza Mojaradi 22 Oct. 1985 44 p refs
(Grant AF-AFOSR-0222-82)
(AD-A163997; AFOSR-85-1236TR) Avail: NTIS HC A03/MF A01 CSCL 21/2

Many dump combustors exhibit low frequency longitudinal combustion instability in the frequency range of 80 to 300 hz. Although the exact causes of combustion instability are not known precisely, it is generally accepted that the interaction of the shock induced pressure pulsation and the coherent vortex shedding at the dump plane induces combustion instability. During this study a characteristic system frequency associated with sudden expansion steps and a resulting coherent beat phenomenon have been identified. It is also shown that combustion oscillation can occur when the induced forced frequency is approximately equal to the mean of the beat frequency. When the coherence of the shear layer at the dump plane is disrupted either by gasjets or by upstream protrusions the effect of combustion instability is found to be minimized. The control system suggested in this report is based upon the idea of disrupting the shear layer at the dump plane by means of pulsing gasjets. The control system senses the critical combination of frequency, amplitude and phase angle upstream of the combustor and actuates the gasjets at the dump plane at an appropriate combination of frequency, amplitude and phase angle to partially negate the effect of upstream pressure pulsation. Experiments in two laboratory scale dump combustors using premixed propane-air mixtures show the feasibility of reducing chamber pressure amplitude by such a technique. GRA

N86-25436# Northwestern Univ., Evanston, Ill. Dept. of Chemistry.
THE SPECTROSCOPY AND REACTION KINETICS OF COORDINATED UNSATURATED METAL CARBONYLS Annual Report, Oct. 1984 - Oct. 1985
Eric Weitz 20 Oct. 1985 49 p refs
(Grant AF-AFOSR-0372-83)
(AD-A164003; AFOSR-86-0032TR) Avail: NTIS HC A03/MF A01 CSCL 07/4

A program involving the investigation and characterization of reactions of coordinatively unsaturated organometallic species is described. The program emphasizes the measurement of rates of reaction of photolytically produced coordinatively unsaturated species with the parent and rates for cluster formation. Experimental measurements are performed using a time resolved transient absorption apparatus which uses a line tunable CO laser to record spectral and kinetic information by means of probing absorptions in the CO stretch region of the infrared. Systems that have been investigated include coordinatively unsaturated species generated from the Fe(CO)5, Cr(CO)6 and Mn2(CO)10 parents. The results of experiments with these systems are briefly discussed. GRA

N86-25437# Advanced Mechanical Technology, Inc., Newton, Mass.
DEVELOPMENT OF A MODEL FOR HOT-SURFACE IGNITION OF COMBUSTIBLE LIQUIDS Final Report, Oct. 1983 - May 1984
Elia P. Demetri and B. F. White Dec. 1985 80 p refs
(Contract F33615-83-C-2380)
(AD-A164057; AFWAL-TR-85-2090) Avail: NTIS HC A05/MF A01 CSCL 21/2

There are many military systems requiring the storage and use of combustible liquids which can accidentally contact a hot surface resulting in a potential fire or explosion hazard. The optimum design of appropriate safety measures is severely hampered by the fact that the thermal ignition of liquids is not well understood. A research study has been conducted to develop and experimentally verify a model of the hot-surface ignition phenomenon for combustible liquids. A large number of parametric tests have been performed to measure surface ignition temperature and delay time for a wide variety of conditions. A simple analytical model has been derived and successfully applied in correlating the experimental data. The results obtained in the study demonstrate the utility of the analytical and experimental techniques which have been developed. GRA

N86-25438# Texas Southern Univ., Houston.
THE STUDY OF SOME EARLY TRANSITION METALS IN OXIDATION STATE 4 USING THE POTASSIUM POLY(PYRAZOLYL) BORATES AS LIGANDS Final Report, 22 Sep. 1980 - 16 Sep. 1985
Bobby L. Wilson 11 Oct. 1985 7 p refs
(Grant DAAG29-80-G-0006)
(AD-A164074; ARO-17759.1-CH-H) Avail: NTIS HC A02/MF A01 CSCL 07/4

The primary purpose of this investigation was to gain a better understanding of the fundamental chemistry of the early transition elements in their high oxidation states. The work involved the preparation and characterization of titanium, zirconium and hafnium poly(pyrazolyl) borate complexes with emphasis on the structure, mode of bonding and magnetic behavior of these complexes. GRA

N86-25439# Rochester Univ., N. Y. Dept. of Chemistry.
STEREOSELECTIVE OXIDATIVE ADDITION OF HYDROGEN TO IRIDIUM(I) COMPLEXES. KINETIC CONTROL BASED ON LIGAND ELECTRONIC EFFECTS
Curtis E. Johnson and Richard Eisenberg 20 Jan. 1986 37 p refs
(Contract N00014-83-K-0154)
(AD-A164235; TR-7) Avail: NTIS HC A03/MF A01 CSCL 07/4

The oxidative addition of H2 to the iridium(I) chelates IrX(CO)(dppe) (X(-) = Cl(-), Br(-), I(-), Cn(-), H(-), PPh3; dppe = 1,2-bis-(diphenylphosphino)ethane) proceeds with > 99% stereoselectivity to yield a cis dihydride product with one hydride trans to P(dppe) and the other hydride trans to CO. For X = Cl, Br, and I, the kinetic product of formula IrH2X(CO)(dppe) equilibrates with a more stable cis isomer which has one hydride trans to P and the other trans to X (K sub eq = 41, 35, and 13, respectively). The stereochemical assignments based on chemical shifts of the hydride ligands are confirmed by single crystal X-ray diffraction analysis of the thermodynamic isomer for X = Br. The complex IrH2Br(CO)(dppe) crystallizes in an orthorhombic space group. The isomerization reaction between the two dihydride isomers was studied mechanistically in acetone and benzene solvents. In acetone, the isomerization of IrH2Br(CO)(dppe) proceeds with first-order kinetics in iridium complex (k = 0.011/min), and the mechanism likely involves a two step H2 reductive elimination/oxidative addition process. For X = CN, the kinetic dihydride isomer is the most stable isomer, but it does thermally equilibrate with two other isomers. For X(-) = H(-) or PPh3, only a single isomer is observed and it appears to be the most stable isomer. The stereoselectivity of D2 oxidative addition for X = H is established by generating the reactive species IrH(CO)(dppe) in situ by dehydrohalogenation of IrH2. GRA

N86-25440# California Univ., Santa Barbara.
PICOSECOND PHOTOCONDUCTIVITY IN TRANS-POLYACETYLENE Technical Report, Jul. - Dec. 1985
M. Sinclair, D. Moses, and A. J. Heeger 4 Feb. 1986 16 p refs
(Contract N00014-85-K-0098)
(AD-A164373; TR-2) Avail: NTIS HC A02/MF A01 CSCL 07/5

Fast transient photoconductivity measurements of trans-polyacetylene as a function of temperature and photon energy indicate a relatively high quantum efficiency for the photoproduction of mobile, charged, nonlinear excitations. Excitation by a 20ps pulse at 590nm with 10 to the 15th power photons/sq cm results in a transient photoconductivity of approx. 0.3 S/cm (at 50 ps) with time scale for decay similar to that measured in picosecond photoinduced absorption experiments. The temperature independence of the fast photoconductivity is interpreted in terms of the photoproduction of hot soliton excitations. GRA

N86-25441# Naval Postgraduate School, Monterey, Calif.
PARAMETRIC ANALYSIS OF COMBUSTION OF POROUS MEDIUM M.S. Thesis
Antonio C. S. Serapiao Dec. 1985 136 p refs
(AD-A164488; AD-E900539) Avail: NTIS HC A07/MF A01 CSCL 21/2

A computer program for a transient one dimensional mathematical model of combustion in porous medium was used to investigate the effect of medium thickness, permeability and reaction order on combustion. In addition, the effect of heat input on combustion was also studied. GRA

N86-25442# Naval Postgraduate School, Monterey, Calif.
ANALYSIS OF COMBUSTION OF A POROUS MEDIUM M.S. Thesis
Do Sung Park Dec. 1985 61 p refs
(AD-A164491; AD-E900539) Avail: NTIS HC A04/MF A01 CSCL 21/2

A numerical analysis of a heat transfer and combustion model for a porous medium within a circular cylinder is carried out. The basic mechanisms considered in the theory are: a carbon energy conservation equation, energy balance on the air, and an oxygen mass balance equation, energy balance on the air, and an oxygen mass balance equation. Heat transfer mechanisms included in the model are conduction, convection, and radiation. A heat generation term arising from combustion of the carbon is included in the model. Transport mechanisms for oxygen mass transfer are molecular diffusion and convective transport. The governing heat and mass transfer equations are solved numerically by the Galerkin formulation of the Finite Element Method. The results show the effects of permeability, porosity, geometry and initial condition on the behavior of the system. GRA

N86-25443# Los Alamos National Lab., N. Mex.
THEORETICAL STUDIES OF THE C4 MOLECULE
J. P. Ritchie, H. F. King, and W. S. Young 1985 13 p refs Presented at the NATO Advanced Study Inst.: Advances in Chemical Reaction Dynamics, Iraklion, Crete, 25 Aug. 1985 Prepared in cooperation with State Univ. of New York, Buffalo
(Contract W-7405-eng-36)
(DE86-002429; LA-UR-85-3846; CONF-8508119-2) Avail: NTIS HC A02/MF A01

Optimized geometries and relative energies for three states of the C4 molecule have been obtained from single-reference configuration interaction (SRCI) calculations. At the SRCI level, a rhombic form is calculated to lie 1.1 kcal below the triplet form; consideration of the Davidson correction reduces this difference to 0.4 kcal, while more complete basis sets are expected to increase the difference only by about 0.2 kcal. Consideration of these effects and difference in zero-point energy leads to a final estimated splitting of 1.2 kcal, favoring the rhombus. To aid the determination of the ground state, preliminary estimates of the lowest optical transitions were obtained from SRCI calculations and vibrational frequencies were obtained from SCF calculations. Comparison of the calculated results with experimentally obtained spectra suggest the possibility that both the linear triplet and the rhombus may have already been observed. DOE

N86-25444# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
ALUMINUM, BORON AND MERCURY MEASUREMENT VIA ION-EXCHANGE
S. L. Maxwell, III 15 Apr. 1986 7 p refs Presented at the 28th Oak Ridge National Lab. Conference on Analytical Chemistry, Knoxville, Tenn., 1 Oct. 1985
(Contract DE-AC09-76SR-00001)
(DE86-003147; DP-MS-85-66; CONF-8510151-13) Avail: NTIS HC A02/MF A01

The accurate measurement of aluminum, boron, and mercury in process dissolver solutions at the Savannah River Plant (SRP) is important. Costs for the processing of non-SRP uranium fuels are based in part on the measured aluminum content of the fuel. Boron is a nuclear safety control in some dissolutions and mercury (II) is a catalyst in the dissolution of uranium-plutonium oxide fuels. In analyses, ion exchange is used for selective separations and for removing high activity constituents in dissolver solutions prior to measurement via direct current argon plasmas (DCAP) spectrometry. Aluminum is separated via anion exchange using oxalate-hydrochloric acid mixtures, boron is separated via cation exchange using 0.05 M nitric acid, and mercury (II) is separated via cation exchange using 40% ethanol-0.2 M hydrochloric acid. The aluminum content is measured with a precision of better than + or - 1.0% (RSD) using gravimetric dilutions and sample measurements bracketted by standard measurements. Boron and mercury are measured with a precision of better than + or - 3.0% (RSD) using volumetric dilutions. DOE

N86-25445# National Bureau of Standards, Gaithersburg, Md. Center for Fire Research.
FORCED SMOLDER PROPAGATION AND THE TRANSITION TO FLAMING IN CELLULOSIC INSULATION Final Report
T. J. Ohlemiller Oct. 1985 50 p refs Sponsored in part by DOE
(PB86-166659; NBSIR-85/3212) Avail: NTIS HC A03/MF A01 CSCL 21B

A smoldering fuel responds to an increased oxygen supply by becoming faster and hotter until, eventually, flames erupt. This sequence is examined quantitatively for thick horizontal layers of a permeable fuel, i.e., cellulosic insulation. Two configurations are possible, forward and reverse smolder; both are investigated experimentally. The influence of combustion retardants is also investigated; these include boric acid, a smolder retardant; and borax, a flaming retardant. Both prevent the transition to flaming in the absence of adjacent flammable material but are less effective in its presence. The overall response of these various fuel mixtures and configurations suggests that both kinetics and oxygen supply rate (not the latter alone) play substantial roles in dictating smolder response to an air flow. GRA

N86-25446# Amerind Publishing Co. Pvt. Ltd., New Delhi (India).
X-RAY OPTICS AND MICROANALYSIS. TRANSACTIONS OF THE INTERNATIONAL CONFERENCY (8TH) ON X-RAY OPTICS AND MICROANALYSIS HELD AT MOSCOW-KIEV ON JULY 9-16, 1974
I. B. Borovskii and N. I. Komyak 1985 460 p refs Transl. into ENGLISH of mono. "Optika Rentgenovskikh Luchei i Mikroanaliz" Leningrad, USSR, Mashinostroenie, 1976 Conference held in Moscow-Kiev, USSR, 9-16 Jul. 1974 Sponsored by NSF Prepared for National Bureau of Standards, Gaithersburg, Md.
(PB86-155173; TT-81-52155) Avail: NTIS HC A20/MF A01 CSCL 07D

Over the past decade, many new localized techniques have come into use, such as the method of secondary ion emission, x-ray photoelectron spectroscopy, electron spectroscopy in solutions, spectroscopy at threshold potentials, x-ray spectral probe microanalysis, etc. A high resolution in depth, which varies between 0.2-0.5 and 4-5 nm, is characteristic of all these methods. The volume includes articles presented at the VII International Conference on X-RAY Optics and Microanalysis by leading Soviet and foreign scientists. It covers a wide range of problems relating to the technique of quantitative localized analysis and presents the results of practical application of localized methods in metal physics, physical metallurgy, mineralogy and in the study of semiconductors. It contains a number of articles devoted to the principles of designing instruments for localized analysis. GRA

N86-25447# National Bureau of Standards, Gaithersburg, Md. Center for Fire Research.
LITERATURE REVIEW OF THE CHEMICAL NATURE AND TOXICITY OF THE DECOMPOSITION PRODUCTS OF POLYETHYLENES
M. Paabo and B. C. Levin Jan. 1986 68 p refs Sponsored by Consumer Product Safety Commission, Bethesda, Md.
(PB86-163409; NBSIR-85/3268) Avail: NTIS HC A04/MF A01 CSCL 07D

The literature on polyethylenes has been reviewed with an emphasis on the identification of gaseous products generated under various thermal decomposition conditions and the toxicity of those products. The review is limited to publications in English through 1984. The analytical chemical studies of the thermal decomposition products generated under vacuum, inert and oxidative experimental conditions are described. In oxidative atmosphere, which most closely simulate real fire conditions, carbon monoxide (CO) was found to be the predominant toxicant. Acrolein was another toxicant often noted in these reviewed studies. More acrolein was generated under non-flaming than under flaming conditions. Results from seven different test procedures were considered in assessing the acute inhalation toxicity of combustion products from various polyethylene formulation. The combustion products generated from the polyethylenes studied in the non-flaming mode appeared to be slightly more toxic than those produced in the flaming mode. GRA

N86-25448# Natioanl Center for Toxicological Research, Jefferson, Ark.
HIGH-FIELD NMR (NUCLEAR MAGNETIC RESONANCE) FOR STRUCTURAL ANALYSIS OF COMPLEX POLYCYCLIC AROMATIC HYDROCARBONS Final Report
F. E. Evans and D. W. Miller Mar. 1985 17 p
(PB86-150653; NCTR-6077; FDA/NCTR-86/56) Avail: NTIS HC A02/MF A01 CSCL 07D

High-field NMR for structural analysis of complex polycyclic aromatic hydrocarbons 1H nuclear magnetic resonance (NMR) spectroscopy measurements were carried out at 270 MHz on several polycyclic aromatic hydrocarbons (PAHs) and their metabolites and on aromatic amine derivative. Several new NMR techniques were tested and found to be applicable to spectral analysis and structure elucidation. The 500 MHz NMR spectra exhibited a high level of peak dispersion. The combination of high

field measurements with resolution enhancement techniques resulted in considerable resolvable fine structure in the NMR spectra, due to long-range coupling constants. The analysis of long-range coupling, with the aid of homonuclear decoupling, demonstrated that long-range coupling constant data provide a practical approach to structural studies of PAHs and aromatic amines in general. Nuclear Overhauser effect (NOE) difference spectra are shown to provide an alternative method of spectral analysis, which is complementary to the coupling constant data. GRA

N86-25449# United Kingdom Atomic Energy Authority, Harwell (England). Materials Development Div.
CHARACTERISATION BY RAMAN SPECTROSCOPY OF OXIDE SCALES FORMED ON A 20%Cr/25%Ni/NIOBIUM STABILISED STAINLESS STEEL
W. A. England, M. F. Bennett, D. A. Greenhaigh, S. N. Jenny, and C. F. Knights May 1985 20 p refs
(AERE-R-11816; AGR/FPWG/P(85)675) Avail: Issuing Activity

Laser Raman Spectroscopy (LRS) was used to examine the composition of 0.3 to 2 micron thick scales formed on the 20%Cr/25%Ni/Nb (20/25/Nb) stabilized stainless steel during oxidation, at 600 to 950 C, In CO2 and in CO2 + 4%/Co + 350 vpm CH4 + 300 vpm H2. All the scales contained iron rich spinel oxides, except in carbon dioxide at 600 C, where Fe2O3 predominated. This difference was responsible for the greater attack of the 20/25/Nb stainless steel at 600 C in carbon dioxide than in the mixed gas environment. At 800 and up the spinel composition was modified by manganese incorporation and Cr2O3 was also a major constituent of the scales formed in both environments. The major scale constituents identified by LRS are both in accordance with thermodynamic predictions and understanding of scale development on the 20/25/Nb steel. E.A.K.

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N86-25450 British Library Lending Div., Boston Spa (England).
PERFECTING ECONOMIC METHODS OF CONTROLLING THE QUALITY OF METAL FOR IMPORTANT APPLICATIONS
I. I. Ivanov and N. I. Astakhova 1986 11 p refs Transl. into ENGLISH from Izvestiya VUZ, Chernaya Metall. (USSR), no. 9, 1981 p 145-150
(BLLD-5828.4-M-36674) Avail: British Library Lending Div., Boston Spa, Engl.

The effectiveness for the national economy of the USSR of producing and using metal of improved quality, particularly steels and alloys obtained with the use of electroslag and other remelting processes, is considered. This effectiveness can be substantially raised by improving the planning and pricing system. A better pattern of utilization of steels and alloys with allowance for changes in the user properties of the products would also help. Author

N86-25451 British Library Lending Div., Boston Spa (England).
CONTROLLING THE AUSTENITE GRAIN IN A HIGH SPEED STEEL
S. G. Morozenko, B. E. Natapov, L. D. Moshkevich, and V. M. Ryabkina 1986 6 p Transl. into ENGLISH from Stal (USSR), no. 9, 1985 p 74
(BLLD-5828.4-M-36652) Avail: British Library Lending, Boston Spa, England

Details are given for using the Schneider-Graf method of calculating the number of grain intersections on matt microscope glass (or micro-photographs) in different lengths with different magnifications; the data are plotted as a nomogram. The results provided are compared with those obtained by other methods. It is concluded that the method of comparison with the GOST 5639-82 scales can normally be used, but that in cases of argument or of metal for export the Schneider-Graf method should be used. Author

N86-25452 British Library Lending Div., Boston Spa (England).
INFLUENCE OF ATMOSPHERE ON TITANIUM OXIDATION LOSSES DURING ALLOYING OF STAINLESS STEEL WITH TITANIUM
G. O. Neigebauer, A. N. Naboko, and N. A. Rozhkova 1986 4 p ref Transl. into ENGLISH from Izvestiya VUZ Chernaya Metallurgiya (USSR), no. 8, 1985 p 149-150
(BLLD-5828.4-M-36640) Avail: British Library Lending, Boston Spa, England

The influence of atmosphere on oxidation losses of titanium was assessed in comparative laboratory tests on ladle alloying of stainless steel 08-12Kh18N10T with ground 70% ferrotitanium in an air atmosphere (open ladle) and an argon atmosphere (closed ladle). Author

N86-25453*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TENSILE BEHAVIOR OF Fe-40Al ALLOYS WITH B AND Zr ADDITIONS
Darrell J. Gaydosh and Michael V. Nathal 1986 27 p refs Presented at the 1986 TMS-AIME Annual Meeting, New Orleans, La., 2-6 Mar. 1986
(NASA-TM-87290; E-2997; NAS 1.15:87290) Avail: NTIS HC A03/MF A01 CSCL 11F

Both Fe-40Al and Fe-40Al-0.1Zr with and without B were produced by the hot extrusion of powdered metal. Tensile properties were determined from room temperature to 1100 K in air. All of the materials possessed some ductility at room temperature, and addition of B caused an increase in ductility and a change in fracture mode from intergranular to transgranular cleavage. At high temperatures, failure was caused primarily by the formation of grain boundary cavities in all of the alloys. The effect of Zr addition was unclear because of the complexity of the various microstructures. Comparison of air and vacuum testing at high temperatures revealed that an apparent oxidation assisted mechanism reduced high temperature ductility in these alloys, especially at 900 K. Author

N86-25454*# Pennsylvania State Univ., University Park. Dept. of Engineering Science and Mechanics.
AXIAL AND TORSIONAL FATIGUE BEHAVIOR OF WASPALOY Final Report
S. Zamrik, M. Mirdamadi, and F. Zahiri Apr. 1986 27 p
(Grant NAG3-264)
(NASA-CR-175052; NAS 1.26:175052; USAAVSCOM-TR-86-C-14) Avail: NTIS HC A02/MF A01 CSCL 11F

The cyclic flow response and crack growth behavior of Waspaloy at room temperature and 650 C under tensile loading and torsional loading was studied, for two conditions of Waspaloy: fine grain, large gamma prime size; coarse grain, small gamma prime size. The fine grain material showed 5 to 10 percent hardening after about 10 percent of life, with sequent softening to failure at both themperature levels. The coarse grain material showed either stable response or monotonic softening to failure. Early crack initiation was observed on planes of maximum shear, with eventual branching to principle planes under torsional loading; cracks were always normal to load axis under tensile loading. Also, crack paths were intergranular at 650 C, mostly transgranular at room temperature. Author

N86-25455*# Georgia Inst. of Tech., Atlanta. School of Materials Engineering.
YIELDING AND DEFORMATION BEHAVIOR OF THE SINGLE CRYSTAL NICKEL-BASE SUPERALLOY PWA 1480
Walter W. Milligan, Jr. May 1986 96 p refs
(Grant NAG3-503)
(NASA-CR-175100; NAS 1.26:175100; USAAVSCOM-TR-86-C-18) Avail: NTIS HC A05/MF A01 CSCL 11F

Interrupted tensile tests were conducted to fixed plastic strain levels in < 100 > ordered single crystals of the nickel based

superalloy PWA 1480. Testing was done in the range of 20 to 1093 C, at strain rate of 0.5 and 50%/min. The yield strength was constant from 20 to 760 C, above which the strength dropped rapidly and became a stong function of strain rate. The high temperature data were represented very well by an Arrhenius type equation, which resulted in three distinct temperature regimes. The deformation substructures were grouped in the same three regimes, indicating that there was a fundamental relationship between the deformation mechanisms and activation energies. Models of the yielding process were considered, and it was found that no currently available model was fully applicable to this alloy. It was also demonstrated that the initial deformation mechanism (during yielding) was frequently different from that which would be inferred by examining specimens which were tested to failure. Author

N86-25456# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

ELEVATED TEMPERATURE PROPERTIES OF CAST ALUMINUM ALLOYS A201-T7 AND A357-T6 Final Report, Dec. 1982 - Dec. 1984

J. D. Tirpak Nov. 1985 52 p refs

(AD-A163487; AFWAL-TR-85-4114) Avail: NTIS HC A04/MF A01 CSCL 11/6

The tensile, fatigue, fracture toughness, and fatigue crack growth properties of cast aluminum alloys A201-T7 and A357-T6 were evaluated at 250 F and 400 F. The tensile strength of A201-T7 decreased slightly at 250 F and dropped markedly at 400 F. The A201-T7 elongation increased as temperature increased. The tensile strength of A357-T6 decreased as test temperature increased. A357-T6 ductility increased then decreased as temperature increased. Valid fracture toughness values were difficult to obtain for both alloys. A201-T7 had an average K sub Ic of 22.3 ksi in at 250 F and an average K sub Q of 25.0 ksi in at 400 F. For A357-T6 K sub Q values were 27.5 ksi in and 18.1 ksi in at 250 F and 400 F, respectively. Constant load amplitude fatigue strength decreased for both alloys. At low Ks, fatigue crack growth resistance decreased as test temperature increased. GRA

N86-25457# North Carolina State Univ., Raleigh. Dept. of Materials Engineering.

A STUDY INTO THE MECHANISM(S) FOR THE ELECTRO-PLASTIC EFFECT IN METALS AND ITS APPLICATION TO METALWORKING Final Report, 1 May 1981 - 31 Oct. 1985

Hans Conrad 31 Dec. 1985 74 p refs

(Contract DAAG29-81-K-0075)

(AD-A163785; ARO-18184.12-MS) Avail: NTIS HC A04/MF A01 CSCL 11/6

High density (approx. 100,000 A/sq. cm.) d.c. current pulses (approx. 100 microsec) produced a marked decrease in the flow stress of polycrystalline metals (Al, Cu, Ni, Fe, Nb, W, Ti) tested in tension and in the force to draw Cu wire. A significant fraction of the decrease in stress or force could be attributed to drift electron-dislocation interactions, a major component of which was an electron wind with a push coefficienct of approx. 0.0001 dyn-sec/sq. cm. High density current pulses also enhanced the rates of sintering Al powder compacts, the recovery, recrystallization and grain growth of Cu and grain growth in Ti. In addition, the current pulses reduced the annealing twin frequency in Cu and sharpened the grain size distribution in Ti. No significant effect of current pulses on H-embrittlement of Fe at 300K was found. A continuous d.c. current of 650 A/sq. cm. retarded the tempering rate of a hardened tool steel. On the other hand, no changes were noted in the fatigue life of 316 stainless steel for continuous currents of 10 to 100 A/sq.cm., nor in the annealing behavior of Cu for currents of 200 to 3100 A/sq.cm. The deformation kinetics of Nb single crystals in the normal state were determined over the temperature range of 4.2 to 300K, employing a magnetic field at temper atures below 10K to retain the normal state. The results led to the conclusion that the rate controlling mechanism was thermally-activated overcoming of the Peierls hills by the nucleation and migration of kink-pairs on screw dislocations, the kink-pair energy for Nb being 0.66 ev. GRA

N86-25458# Georgia Univ., Athens.

METAL CLUSTER TOPOLOGY. PART 4: RHODIUM CARBONYL CLUSTERS HAVING FUSED POLYHEDRA

R. B. King 29 Jan. 1986 32 p refs

(Contract N00014-84-K-0365)

(AD-A164218; TR-18) Avail: NTIS HC A03/MF A01 CSCL 07/3

Previously discussed topological models of metal cluster bonding are now extended to the treatment of anionic rhodium carbonyl clusters having structures consisting of fused polyhedra. Examples of such rhodium carbonyl clusters built from fused octahedra include the biphenyl analogue Rh12(CO)30(-2), the face-sharing naphthalene analogue Rh9(CO)19(3-), and the perinaphthene analogue, Rh11(CO)23(3-). More complicated anionic rhodium carbonyl clusters discussed include the Rh13(CO)24H5-q (q-) anions (q = 2,3,4) having an Rh13 centered cuboctahedron, the Rh14(CO)25H4-q(q-) (q = 3,4) and Rh14(CO)26(2-) anions based on a centered pentacapped cube, the Rh15(CO)30(3-) anion having an Rh15 centered 14-vertex deltahedron, the Rh15(CO)27(3-) anion having a tricapped centered 11-vertex polyhedron, the Rh17(CO)30(3-) anion having a tetracapped centered cuboctahedron, and the Rh22(CO)37(4-) anion having a hexacapped centered cuboctahedron fused to an octahedron so that the octahedron and the cuboctahedron share a triangular face. Analyses of the bonding topologies in Rh9(CO)19(3-), Rh17(CO)30(3-), and Rh22(CO)37(4-) indicate that a polyhedral network containing several fused globally delocalized polyhedral chambers will not necessarily have a multicenter core bond in the center of each such polyhedral chamber. This observation is of potential importance in extending topological models of metal cluster bonding to bulk metals. GRA

N86-25459# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE INFLUENCE OF MICROSTRUCTURE ON THE STRENGTH AND TOUGHNESS AND THE FATIGUE CRACK PROPAGATION IN CrWMn STEELS

Litong Huang and Yunbo Chen 24 Jan. 1986 23 p refs Transl. into ENGLISH from Jin Shu Re Chu Li (China), no. 2, 1984 p 22-30

(AD-A164312; FTD-ID(RS)T-1156-85) Avail: NTIS HC A02/MF A01 CSCL 11/6

In this paper, we describe the interrelation between the microstructures of CrWMn high carbon steels of cold punch dies and strength, fracture resistance at static bending state, deflection and fracture toughness after various heat treatments. The influence of microstructures on the pregnant period of the fatigue crack No and the fatigue crack growth rate da/dN is also studied. Our experimental results show that after carbides refining pretreatment, the quenching and tempering structures have maximum strength, the No increases remarkably and the da/dN decreases at the low stress intensity factore Delta K range. After carbides refining pretreatment, the isothermal quenching structures have the best combination of strength and toughness of a mixed martensite structure with 50% bainite is obtained. It also can prolong the pregnant period of nucleation of fatigue cracks and reduce da/dN at the midstream intensity factor Delta K range. According to the examination of fatigue fractures by a scattering electron microscope, the fracture of a conventional quenching and tempering structure with coarse carbides is mainly intergranular. GRA

N86-25460# California Univ., Santa Barbara. Dept. of Physics.

NON-LOCAL SCREENING IN METAL SURFACES Technical Report, Jun. - Dec. 1985

E. Krotscheck and W. Kohn 10 Feb. 1986 17 p refs

(Contract N00014-84-K-0548)

(AD-A164340; TR-7) Avail: NTIS HC A02/MF A01 CSCL 11/6

The effect of the non uniform environment on the static screening of the Coulomb potential causes a major change in the calculated surface energy of simple metals. GRA

N86-25641# Georgia Univ., Athens. Dept. of Chemistry.

METAL CLUSTER TOPOLOGY. 1: OSMIUM CARBONYL

CLUSTERS
R. B. King 29 Jan. 1986 30 p refs
(Contract N00014-85-K-0365)
(AD-A164372; TR-15) Avail: NTIS HC A03/MF A01 CSCL 07/4

Important theoretical approaches to metal cluster bonding including the Wade-Mingos skeletal electron pair method, the Teo topological electron count, the King-Rouvray graph theory derived method, and Lauher's extended Huckel calculations are shown to agree in their apparent skeletal electron counts for the most prevalent metal cluster polyhedra including the tetrahedron, the trigonal bipyramid (both ordinary and elongated), square pyramid, octahedron, bicapped tetrahedron, pentagonal bipyramid, and capped octahedron. The graph theory derived method is used to treat osmium carbonyl clusters containing from five to eleven osmium atoms. In this connection most osmium carbonyl clusters can be classified into the following types: (1) clusters exhibiting edge-localized bonding containing multiple tetrahedral chambers; and (2) capped octahedral clusters derived from osmium carbonyl fragments. Other more unusual osmium carbonyl clusters such as the planar, the Os9 cluster, and the Os11 cluster can also be treated satisfactorily by this methods. GRA

N86-25462# Georgia Univ., Athens. Dept. of Chemistry.
METAL CLUSTER TOPOLOGY. 2: GOLD CLUSTERS
R. B. King 29 Jan. 1986 30 p refs
(Contract N00014-85-K-0365)
(AD-A164395; TR-16) Avail: NTIS HC A03/MF A01 CSCL 07/2

Previously developed methods for the treatment of polyhedral boranes, carbonranes, and metal clusters are extended to the treatment of gold clusters, which present a variety of new problems. In most cases gold atoms in such cluster compounds do not employ the usual 9-orbital sp superscript 3 d superscripts spherical bonding orbital manifold. Instead almost all non-tetrahedral gold clusters consist of a center gold atom surrounded by a puckered polygonal belt of peripheral gold atoms generally with one or more additional peripheral gold atoms in distal positions above and/or below the belt. The peripheral gold atoms in such clusters use a 7-orbital spd superscripts cylindrical bonding orbital manifold, but their residual two orthogonal antibonding p orbitals can receive electron density from the filled d orbitals of adjacent peripheral gold atoms through backbonding leading to bonding distances between adjacent peripeheral gold atoms. Centered gold clusters can be classified into either spherical or toroidal clusters. The topology of the core bonding in gold clusters mimics the toplogy of the polyhedron formed by the surface atoms. Examples of non-centered gold clusters treated in this paper include the squashed pentagonal bipyramidal Au7(PPH3)7+ and the edge-fused bitetrahedral (Ph3P)4Au6Co(CO)42 which may be regarded as a perauraethylene in which the six cluster gold atoms correspond to the six atoms of ethylene including a double bond between the two gold atoms corresponding to the two ethylene carbon atoms. GRA

N86-25463# California Univ., Berkeley. Lawrence Berkeley Lab.
EFFECT OF SURFACE APPLIED REACTIVE ELEMENT OXIDES ON THE OXIDATION OF Cr-CONTAINING BINARY ALLOYS
P. Y. Hou and J. Stringer 15 Apr. 1986 29 p Presented at the 168th Meeting of the Electrochemical Society, Las Vegas, Nev., 13 Oct. 1985 Prepared in cooperation with Electric Power Research Inst., Palo Alto, Calif.
(Contract DE-AC03-76SF-00098)
(DE86-002878; LBL-20326; CONF-851048-9) Avail: NTIS HC A03/MF A01

The influence of surface applied Ca, Ce, Hf, La, Y, and Zr nitrate-converted oxides on the oxidation behavior of Co-15 wt% Cr, Co-25 wt % Cr and Ni-25 wt % Cr alloys at 1000 C in 1 atm O2 has been studied. The surface oxides appeared to be most beneficial on the established Cr203 forming alloy, showed no effects on the non-Cr203 forming alloy and acted as a semi-barrier on the borderline Cr203 former. Results are compared and discussed with the effects found when the reactive element oxides are present as dispersions within the alloys. DOE

N86-25464# Brookhaven National Lab., Upton, N. Y.
QUASICRYSTALLINE STRUCTURES OF TRANSITION METAL/METALLOID GLASSES
R. E. Watson and L. H. Bennett 1985 9 p Presented at the International Conference on Magnetism, San Francisco, Calif., 26 Aug. 1985 Prepared in cooperation with National Bureau of Standards, Washington, D.C.
(Contract DE-AC02-76CH-00016)
(DE86-002932; BNL-37168; CONF-850890-24) Avail: NTIS HC A02/MF A01

The Wigner-Seitz method has been used to specify the near-neighbor environments in glass-forming TM crystalline phases, where T = Cr, Mn, Fe, Cu, Ni and M = P, B, Si. The crystal structures fall into different topological classes which may well account for the polymorphism in the glasses. DOE

N86-25465# Allied Bendix Corp., Kansas City, Mo.
AUTOMATED ION CHROMATOGRAPHIC ANALYSIS OF PLATING SOLUTIONS
R. E. Smith and P. L. Annable Nov. 1985 15 p refs
(Contract DE-AC04-76DP-00613)
(DE86-003128; BDX-613-3373) Avail: NTIS HC A02/MF A01

Ion chromatography is an analytical technique that is capable of rapid, multi-component analysis of a variety of samples. The method is based on chromatographic separation of the various components followed by detection using any of three available detectors. Three general types of columns are used: anion exchange, cation exchange, and nonpolar. Conductivity, electrochemical, and ultraviolet-visible (UV-Vis) detectors can be used with any of the columns. This provides the analyst with sufficient versatility to analyze the complex mixtures present in many plating baths. It is especially useful to employ automation to provide maximum efficiency in analysis time. The analyses required most frequently must be outlined so that the appropriate columns and detectors can be properly installed. This paper will describe the basic principles of ion chromatography and will list the columns and detectors required for analyzing different plating solutions so that the individual analysts can optimize their systems. DOE

N86-25466# Oak Ridge National Lab., Tenn.
METALLOGRAPHIC EXAMINATION OF RESPONSE OF 3 Cr-1.5 Mo STEEL TO HEAT TREATMENT
R. W. Swindeman, A. M. Nasreldin, R. L. Klueh, and J. F. King Nov. 1985 38 p refs
(Contract DE-AC05-84OR-21400)
(DE86-004589; ORNL/TM-9691) Avail: NTIS HC A03/MF A01

The influence of austenitizing temperature, cooling rate, and tempering conditions on the microstructure of 3 Cr-1.5 Mo steels was examined in order to establish the heat treatment needed to produce fine-grained bainitic microstructures. Most of the work was performed on samples from an 8-ton commercial heat of a composition developed by the Climax Molybdenum Company that contained a manganese addition for hardenability and a vanadium addition for strength. This material was examined in both the normalized-and-tempered and the quenched-and-tempered conditions. The material was found to be fully bainitic in both the coarse- and fine-grained conditions. Additional studies were performed on another 8-ton commercial heat of a composition developed by the University of California, Berkeley, that contained more nickel and less manganese. This material also possessed adequate hardenability to produce bainitic microstructures for cooling conditions that would result in some proeutectoid ferrite in standard 2.25 Cr-1 Mo steel. Both compositions developed the microstructures and concomitant strength and toughness needed to be competitive with other developing microalloyed steels for use in hydrogen service. DOE

N86-25467# Lawrence Livermore National Lab., Calif.
ELECTROCHEMICAL EVALUATION OF THE EFFECT OF HEAT TREATMENT AND STRESS ON THE CORROSION CHARACTER-

ISTICS OF 7050 ALUMINUM IN 3.5 PERCENT NaCl SOLUTION
R. S. Glass and J. C. Estill Nov. 1985 26 p
(Contract W-7405-eng-48)
(DE86-004181; UCID-20597) Avail: NTIS HC A03/MF A01

Potentiodynamic polarization curves have been used to evaluate (in a survey mode) the effect of heat treatment and stress on the corrosion behavior of 7050-XX aluminum in deaerated 3.5% NaCl solutions. Specimens, which were machined from extruded ring material, were examined in the as-received condition and following heat treatment at 580 F for 0.5 min. The stress levels used in this study ranged from 40 to 90% of the 0.2% offset yield strength. Results indicate that within this stress range, using the given experimental method, medium, and timescales, that there is no significant trend for the effect of stress on the electrochemical-corrosion behavior for the materials examined. The heat-treated specimens have lower uniform corrosion rates than the as-received forms, but are more susceptible to pitting. However, pitting is not spontaneous for either material in this environment. In addition to investigating the variables of stress and heat treatment, also compared were the behavior of specimens machined from three different orientations within extruded ring material. Generally, the longitudinal and circumferentially oriented specimens were more similar electrochemically than specimens obtained from the radial orientation. The radial specimens generally showed lower uniform corrosion rates and appeared to be less susceptible to pitting. DOE

N86-25468# Environmental Protection Agency, Research Triangle Park, N.C. Atmospheric Sciences Research Lab.
ENVIRONMENTAL FACTORS AFFECTING THE CORROSION OF WEATHERING STEEL
F. H. Haynie Dec. 1985 12 p
(PB86-136074; EPA-600/D-85-294) Avail: NTIS HC A02/MF A01 CSCL 11F

Weathering steel samples were exposed for periods of up to 30 months at nine air monitoring sites in the St. Louis, Missouri area. Climatic and air quality data were recorded during the exposure period and subjected to a rigorous evaluation to eliminate recording errors and to estimate missing values. Weight loss was used as the measure of steel corrosion. Corrosion rate was evaluated with respect to: (1) flux of pollutants to the steel during both wet and dry periods; (2) temperature; and (3) exposure history. Different definitions of when the steel was wet were evalauted to determine the most likely critical relative humidity. Non-linear multiple regression techniques were used to determine the statistical significance of each factor and develop a theoretically consistent environmental damage function. Author (GRA)

N86-25469# National Bureau of Standards, Gaithersburg, Md. Inst. for Materials Science and Engineering.
METALLURGY TECHNICAL ACTIVITIES, 1985
E. N. Pugh and J. G. Early Nov. 1985 116 p refs
(PB86-165032; NBSIR-85-3191) Avail: NTIS HC A06/MF A01 CSCL 11F

The FY1985 activities of the Metallurgy Division of the National Bureau of Standards are summarized. The research centers upon the structure-processing-properties relations of metals and alloys, and on the methods of their measurement. Task efforts comprise studies of synchrotron radiation research for materials characterization, metallurgical processing, wear and mechanical properties, chemical metallurgy, corrosion and protection of metals, electrodeposition, and nondestructive characterization. The work herein described includes three cooperative data programs with American professional societies and industry: the American Society for Metals-NBS Alloy Phase Diagram Program, the National Association of Corrosion Engineers-NBS Corrosion Data Program, and the American Iron and Steel Institute-NBS Steel Sensor Program. The scientific publications, invited talks, committee participation, and other professional interactions of the 91 full-time and part-time members of the Metallurgy Division and its 33 guest researchers are identified. GRA

N86-25470# Amerind Publishing Co. Pvt. Ltd., New Delhi (India).
DIFFUSION AND STRUCTURE OF METALS
S. Z. Bokshtein 1985 177 p refs Transl. into ENGLISH of book "Diffuziya i Struktura Metallov" Moscow, Metallurgiya, 1973 Sponsored in part by National Science Foundation, Washington, D.C. Prepared for National Bureau of Standards, Gaithersburg, Md.
(PB86-156742; TT-79-52022) Avail: NTIS HC A09/MF A01 CSCL 11F

Diffusion is a process which determines the structure and properties of metals and, as a result, their characteristics under service conditions. The monograph examines various methods of studying diffusion, the influence of structural defects and especially diffusion in mutliphase systems during the occurrence of complex processes. The book is recommended for researchers in physical metallurgy and metal physics, for engineers, and for students of metallurgy. GRA

N86-25471# National Materials Advisory Board, Washington, D. C.
BASIC AND STRATEGIC METALS INDUSTRIES: THREATS AND OPPORTUNITIES Final Report
21 Oct. 1985 161 p Sponsored by Federal Emergency Management Agency
(Contract EMW-83-C-1350)
(PB86-154499; NMAB-425) Avail: NTIS HC A08/MF A01 CSCL 11F

Five strategic metals processing industries (iron and steel, copper, aluminum, titanium, and superalloys) are assessed in terms of their capability and survival problems in the worldwide competitive marketplace. The availability and economic issues of four critical alloying elements (chromium, cobalt, columbium, and tantalum) are discussed. An overview of the current status of each of these industries is presented in terms of its unique characteristics and needs. Some innovative technologies and processing steps are identified as having merit for improving the competitive posture of these industries. Author (GRA)

N86-25472 City Univ., London (England).
A CONSTITUTIVE MODEL FOR THE INELASTIC MULTIAXIAL CYCLIC RESPONSE OF A NICKEL BASE SUPERALLOY RENE 80 Ph.D. Thesis
V. G. Ramaswamy 1985 251 p
Avail: Univ. Microfilms Order No. DA8527447

A unified constitutive equation which can model a variety of nonlinear material phenomena observed in Rene 80 between 538C and 982C is developed. Five unified constitutive models were reviewed to evaluate their capabilities and limitations. Two models, a generic back stress drag stress model and the Bodner model, were then used to model the behavior of Rene 80 at 982C. Both models were found to have some advantageous features. However, neither proved adequate for Rene 80. A new constitutive model was proposed based on back stress and drag stress. The tensorial back stress was used to model directional effects; whereas, the scalar drag stress was used to model isotropic effects and cyclic hardening or softening. A flow equation and evolution equations for the state variables were developed in multiaxial form. Procedures were developed to generate the material parameters. The model predicted very well the monotonic tensile, cyclic, creep and stress relaxation behavior of Rene 80 at 982C. Dissert. Abstr.

N86-25370# Cambridge Univ. (England). Dept. of Metallurgy and Materials Science.
ASPECTS OF SMALL CRACK GROWTH
M. N. James and J. F. Knott *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 16 p refs
(For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

N86-25372# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
CRACK GROWTH, STRAIN AND DAMAGE MEASUREMENTS USING AN IMPROVED POTENTIAL DROP TECHNIQUE

Humbert Policella, Georges Baudin, and Georges Cailletaud *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 9 p refs In FRENCH; ENGLISH summary (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

N86-25374# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
ADVANCED EXPERIMENTAL METHODS FOR MONITORING THE BEHAVIOR OF SMALL CRACKS
James M. Larsen *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 9 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

N86-25376# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Materials Lab.
ADVANCED, QUANTITATIVE METHODS FOR NONDESTRUCTIVE EVALUATION
Dale E. Chimenti and Thomas J. Moran *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 17 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

N86-26104# Joint Publications Research Service, Arlington, Va.
IMPACT DEFORMATION OF METALS TAKING INTO ACCOUNT BULK MODULUS AND TEMPERATURE Abstract Only
V. P. Mayboroda and N. N. Kholin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 76-77 refs Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 4, Jul. - Aug. 1985 p 103-110 (For primary document see N86-26099 16-26)
Avail: NTIS HC A06/MF A01

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N86-25473*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SPUTTERED CADMIUM OXIDE AS A SURFACE PRETREATMENT FOR GRAPHITE SOLID LUBRICANT FILMS
Robert L. Fusaro 1986 32 p refs To be presented at the ASME/ASLE Tribology Conf., Pittsburgh, Pa., 19-22 Oct. 1986
(NASA-TM-87300; E-3011; NAS 1.15:87300) Avail: NTIS HC A03/MF A01 CSCL 11H

Sputtered films of cadmium oxide were applied to sand blasted AISI 440C HT stainless steel disks as a surface pretreatment for the application of rubbed graphite films. Mixtures of cadmium oxide and graphite were applied to the nonpretreated sandblasted metal and evaluated. The results were compared to graphite films applied to other commercially available surface pretreatments. It is found that sputtered CdO pretreated surfaces increase the endurance lives of the graphite films and decrease the counterface steady state wear rate of the pins almost an order of magnitude compared to commercially available pretreatments. The CdO additions in general improved the tribological properties of graphite. The greatest benefit occurred when it was applied to the substrate rather than mixing it with the graphite and that sputtered films of CdO perform much better than rubbed CdO films. Author

N86-25474*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
IMPROVED PERFLUOROALKYLETHER FLUID DEVELOPMENT
W. R. Jones, Jr., K. Paciorek (Ultrasystems, Inc., Irvine, Calif.), J. Nakahara, M. Smythe, and R. Kratzer 1986 18 p refs Presented at the International Symposium on Chemical Aspects of Wear, Friction, and Lubrication, NewYork, N.Y., 14-18 April 1986; sponsored by American Chemical Society
(NASA-TM-87276; E-2928; NAS 1.15:87276) Avail: NTIS HC A02/MF A01 CSCL 11C

The feasibility of transforming a commercial linear perfluoroalkylether fluid into a material stable in the presence of metals and metal alloys in oxidizing atmospheres at 300 C without the loss of the desirable viscosity temperature characteristics was determined. The approach consisted of thermal oxidative treatment in the presence of catalyst to remove weak links, followed by transformation of the created functional groups into phospha-s-triazine linkages. It it found that the experimental material obtained in 66% yield from the commercial fluid exhibits, over an 8 hr period at 300 C in the presence of Ti(4Al, 4Mn) alloy, thermal oxidative stability better by a factor of 2.6x1000 based on volatiles evolved than the commercial product. The viscosity and molecular weight of the developed fluid are unchanged and are essentially identical with the commercial material. No metal corrosion occurs with the experimental fluid at 300 C. E.A.K.

N86-25475*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE PREPARATION OF NEW PERFLUOROETHER FLUIDS EXHIBITING EXCELLENT THERMAL-OXIDATIVE STABILITIES
W. R. Jones, Jr., T. R. Bierschenk (Exfluor Research Corp., Austin, Tex.), T. J. Juhlke, H. Kawa (Exfluor Research Corp.), and R. J. Lagow (Exfluor Research Corp., Austin, Tex.) 1986 19 p refs Presented at the International Symposium on Chemical Aspects of Friction, Wear and Lubrication, New York, N.Y., 13-18 Apr. 1986; sponsored by the American Chemical Society
(NASA-TM-87284; E-2919; NAS 1.15:87284) Avail: NTIS HC A02/MF A01 CSCL 11C

A series of low molecular weight perfluoroalkylethers (PFAE) were synthesized by direct fluorination. Viscosity-temperature properties and oxidation stabilities were determined. Viscosity-temperature correlations indicated that increases in branching and increases in the size of the branching substituent caused a deterioration in viscometric properties (i.e., an increase in ASTM slope). In addition, increasing the ratio of carbon to oxygen in these compounds also increased the ASTM slope. Preliminary oxidation stability tests indicated that highly branched PFAE fluids. (i.e., those containing quaternary carbons) may be less stable than either those containing a single trifluoromethyl pendant group or those containing no branching at all. Author

N86-25476*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TRIBOLOGY OF SELECTED CERAMICS AT TEMPERATURES TO 900 DEG C
H. E. Sliney, T. P. Jacobson, D. Deadmore, and K. Miyoshi 1986 23 p refs Presented at 10th Annual Conference on Composites and Advanced Ceramic Materials, Cocoa Beach, Fla.,19-24 Jan. 1986; sponsored by American Ceramic Society
(NASA-TM-87267; E-2969; NAS 1.15:87267) Avail: NTIS HC A02/MF A01 CSCL 11B

Results of fundamental and focused research on the tribological properties of ceramics are discussed. The basic friction and wear characteristics are given for ceramics of interest for use in gas turbine, adiabatic diesel, and Stirling engine applications. The importance of metal oxides in ceramic/metal sliding combinations is illustrated. The formulation and tribological additives are described. Friction and wear date are given for carbide and oxide-based composite coatings for temperatures to at least 900 C. Author

N86-25477*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PROCESS FOR CROSSLINKING AND EXTENDING CONJUGATED DIENE-CONTAINING POLYMERS Patent Application
Vernon L. Bell, inventor (to NASA) and Stephen J. Havens, inventor (to NASA) (PRC Kentron, Inc., Hampton, Va.) Filed 11 Mar. 1986 17 p
(NASA-Case-LAR-13452-1; NAS 1.71:LAR-13452-1;
US-Patent-Appl-SN-838655) Avail: NTIS HC A02/MF A01 CSCL 11B

A process using a Diels-Adler reaction which increases the

molecular weight and/or crosslinks polymers by reacting the polymers with bisunsaturated dienophiles is developed. The polymer comprises at least 75% by weight based on the reaction product, has a molecular weight of at least 5000 and a plurality of conjugated 1,3-diene systems incorporated into the molecular structure. A dienophile reaction with the conjugated 1,3-diene of the polymer is at least 1% by weight based on the reaction product. Examples of the polymer include polyesters, polyamides, polyethers, polysulfones and copolymers. The bisunsaturated dienophiles may include bis-maleimide, bisnadimides, bis maleic and bis tumaric esters and amides. This method for expanding the molecular weight chains of the polymers, preferably thermoplastics, is advantageous for processing or fabricating thermoplastics. A low molecular weight thermoplastic is converted to a high molecular weight plastic having improved strength and toughness for use in the completed end use article. Author

N86-25478*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SEMI-2-INTERPENETRATING NETWORKS OF HIGH TEMPERATURE SYSTEMS Patent Application
Annemarie O. Egli, inventor (to NASA) (Kentron International, Inc., Hampton, Va.) and Terry L. St.Clair, inventor (to NASA) Filed 18 Mar. 1986 19 p
(NASA-Case-LAR-13450-1; NAS 1.71:LAR-13450-1; US-Patent-Appl-SN-840816) Avail: NTIS HC A02/MF A01 CSCL 11B

A semi-2-interpenetrating network of improved qualities which is prepared by combining a linear polymer and a cross-linkable oligomer having identical repeating units is developed. Polymers have been combined in the past into interpentrating networks in order to gain useful properties from the combination of materials. However, previous semi-interpenetrating networks have only been formed using polymers having different repeating units. This method provides a semi-2-interpenetrating network of improved characteristics which is constructed by combining a linear polymer with a cross-iinkable oligomer which has the same repeating unit as the linear polymer. The resulting interpenetrating network has improved properties over prior networks because the polymer and oligomer with identical functionalities are mutually soluble and form one homogeneous phase. This eliminates the phase separation problems common to other networks. Author

N86-25479# Lawrence Livermore National Lab., Calif.
STRUCTURAL CHARACTERIZATION OF SILICA AEROGEL USING SPECIFIC SURFACE AREA MEASUREMENTS
C. W. Price, W. G. Halsey, and S. C. Sanders Oct. 1985 18 p Presented at the 13th DOE Surface Studies Conference, Dayton, Ohio, 8-10 Oct. 1985
(Contract W-7405-eng-48)
(DE86-003884; UCRL-92955; CONF-8510181-2) Avail: NTIS HC A02/MF A01

Specific surface area measurements are proving to be useful for the structural characterization of silica aerogels. Transmission electron microscopy (TEM) revealed the aerogel structure to be composed of fibrous chains of linked spherical particles. Surface area calculations based on a hard sphere approximation using the TEM data correspond reasonably well to specific surface area measurements by the BET method. The BET measurements also correspond with surface area measurements generated from low angle X-ray scattering. The reproducibility of the BET measurements was determined to be better than 5%. The confidence level of BET analysis is relatively high, although the absolute accuracy is still open to some speculation. Other techniques that are useful to supplement BET analysis of aerogels are X-ray diffraction, thermal gravimetric analysis, residual gas analysis during outgassing, and infrared spectroscopy. These techniques were used in a preliminary study of the heat treating response of aerogel. DOE

N86-25480# Xerox Palo Alto Research Center, Calif.
RESEARCH ON ELECTRONIC AND STRUCTURAL PROPERTIES OF AMORPHOUS-SILICON-BASED ALLOY MATERIALS Annual Subcontract Report, Jul. 1984 - Jun. 1985
R. A. Street Nov. 1985 41 p
(Contract DE-AC02-83CH-10093)
(DE85-016883; SERI/STR-211-2810) Avail: NTIS HC A03/MF A01

The objective of this research was to understand the electronic and structural properties of a-Si:H, focussing on properties particularly important to electronic devices and attempting to identify their origins. Measurements of metastable defect creation by prolonged illumination have shown that the internal stress that accompanies a-Si:H film growth is one of the major factors in the formation of light-induced defects. Defect creation is suppressed in compensated a-Si:H because impurity-related shallow states dominate the recombination. The annealing kinetics have also been analyzed. Dangling bond states were measured to confirm their energy levels in the gap. The measurements also show that there is little atomic relaxation at the dangling bonds. Defect states have been studied in fluorinated a-Si samples. Neutral donors have been identified for the first time by their hyperfine interaction in ESR. Interface states between a-Si:H and silicon oxide have also been studied. Transient photoconductivity on doped a-Si:H samples has been analyzed to obtain information about the density of shallow states. The photoconductivity decay is apparently dominated by contact effects rather than by bulk recombination. DOE

N86-25481# Rensselaer Polytechnic Inst., Troy, N.Y. Dept. of Chemistry.
MOLTEN CARBONATES: MICROWAVE STUDIES OF THE VAPOR STATE Final Report
C. W. Gillies Aug. 1985 125 p refs
(Contract DE-AC02-81ER-10909)
(DE86-004504; DOE/ER-10909/1) Avail: NTIS HC A06/MF A01

A high temperature microwave spectrometer was developed for the analysis of the vapor above alkali carbonates in fuel cell environments. The absorption cell utilizes nickel foil and a novel support system for the Stark septum. Both Stark modulation and radiofrequency-microwave double resonance (RFMDR) were employed for the observation of the J = 1(YIELDS)2 transitions of potassium hydroxide in several vibrational states. This is the first application of RFMDR techniques at high temperature. The analysis of the hyperfine structure due to nuclear quadrupole splitting of the J=1(YIELDS)2 transitions yielded quadrupole data for the ground state and the first excitations of the K-0 stretch and the degenerate bonding modes. For the ground state the unsplit frequency (NU)0=32,834.33(5)MHz and eQq = 7.19(8) MHz. The unsplit frequencies for all states observed are consistent with rotational and distortion constants obtained from higher J transitions. Experiments with the 62 to 38 mole percent lithium-potassium carbonate eutectic in gas atmospheres which maximize the potassium hydroxide vapor concentration have failed to identify the J = 1(YIELDS)2 transition of monomeric potassium hydroxide. Sensitivity estimates of the high temperature microwave spectrometer indicate that the potassium hy droxide concentrations fall below the detection limit in typical fuel cell gas atmospheres. DOE

N86-25482# City Univ. of New York, Brooklyn.
ELECTROCHEMICAL PROPERTIES OF CONDUCTING, NITROGEN-BEARING IODINATED POLYMERS Final Report, 15 Oct. 1983 - 14 Oct. 1985
Seymour Aronson and Henry Teoh 30 Nov. 1985 13 p refs
(Contract DAAG29-83-K-0158)
(AD-A164052; ARO-20715.2-MS) Avail: NTIS HC A02/MF A01 CSCL 07/4

The primary objective of this investigation was to determine the feasibility of using conducting, iodinated polymers as cathode materials for high energy-density, high power-density electrochemical cells with lithium as the anode. The following nitrogen-bearing, conjugated polymers were either prepared or were purchased: 2-polyvinylpyridine, cyclized polyacrylonitrile, aniline black, paracyanogen, polyquinoxaline, and polybenzimidizole. Only the first three polymers exhibited high electrical conductivity when reacted with iodine. GRA

N86-25483# Emory Univ., Atlanta, Ga. Dept. of Chemistry.
SYNTHESIS AND EXAMINATION OF NEW CATALYTIC POLYMERS Final Report, 1 Sep. 1982 - 31 Aug. 1985
Frederick M. Menger 1 Dec. 1985 8 p refs
(Contract DAAG29-82-K-0131)
(AD-A164069; ARO-19285.6-CH) Avail: NTIS HC A02/MF A01 CSCL 07/3

Research supported by Grant DAAG29-82-K-0131 consisted of the following four components: 1) A new turnover catalyst capable of hydrolyzing phosphate esters under mildly basic conditions has been developed. It is currently being tested in Army laboratories. 2) A polymer-bound 4-aminopyridine has been synthesized which is capable, in the solid state, of catalyzing a variety of organic reactions. 3) A new theory for the high reactivity of intramolecular and enzymatic systems. The theory postulates that the rate of reaction between functionalities A and B is proportional to the time that A and B reside within critical distances. Attempts have been made to evaluate critical distances for organic molecules. 4) Three new multi-armed amphiphiles have been synthesized. Although these materials do not form micelles by themselves, they have the property of seeding micelle formation by conventional surfactants. GRA

N86-25484# Naval Postgraduate School, Monterey, Calif.
RETAINED AMBIENT TEMPERATURE PROPERTIES OF SUPERPLASTICALLY DEFORMED Al-10%Mg-0.1%Zr, Al-10%Mg-0.5%Mn AND Al-10% Mg-0.4%Cu ALLOYS M.S. Thesis
Karl A. Klankowski Dec. 1985 90 p refs
(AD-A164493; AD-E900539) Avail: NTIS HC A05/MF A01 CSCL 11/6

The room temperature mechanical properties of three superplastic, high-Magnesium, Aluminum-Magnesium alloys (Al-10%Mg-0.1%Zr, Al-10%Mg-0.5%Mn, Al-10%Mg-0.4%Cu) were evaluated after simulated superplastic forming at warm temperature. The alloys were initially processed to produce superplastic response. They were then deformed at 300 C to stains of 100 to 200% at strain rates of 1,700 S or 170 S and samples remachined for ambient temperature testing. Results indicate yield strengths of about 276 MPa (40 KSI) are attainable with ductility varying from about 1 to 14 percent elongation at fracture. Ultimate strengths correspondingly vary up to about 517 MPa (75 KSI). Origin of the variability of the ductility is considered. GRA

N86-25485# Naval Postgraduate School, Monterey, Calif.
PLASTIC INSTABILITY OF ALUMINIDE AND PLATINUM MODIFIED DIFFUSION COATINGS DURING 1100 C CYCLIC TESTING M.S. Thesis
Thomas F. Manley, II Dec. 1985 78 p refs
(AD-A164506) Avail: NTIS HC A05/MF A01 CSCL 11/3

Platinum modified and unmodified aluminide diffusion coatings, on a nickel base superalloy (IN-738), were prepared to test the pre-aluminizing surface roughness effect on coating oxide scale adherence. A preliminary study of coating microstructure and surface structure changes during cyclic oxidation at 1100 C was begun. During this testing, significant surface deformation described as rumpling was observed and attributed to plastic instability produced during the cycling. Rumpling is found to be a function of the number and type of thermal strain cycles, thermal expansion mismatch, coating strength, and coating thickness. The role of oxide adherence observed for the Pt modified coatings cannot be determined from the data. Previous mention of this effect was not found in the literature. A similar surface rumpling phenomena, however, has been observed in overlay coating systems under similar conditions. The mechanical and protectivity impact of rumpling can only be inferred due to the limited available data.
Author (GRA)

N86-25486# Cincinnati Univ., Ohio. Dept. of Materials Science and Engineering.
SAX (SMALL-ANGLE X-RAY SCATTERING) STUDY OF MICELLE FORMATION IN MIXTURES OF BUTADIENE HOMOPOLYMER AND STYRENE-BUTADIENE BLOCK COPOLYMER. PART 3: COMPARISON WITH THEORY
R. J. Roe 15 Jan. 1986 25 p
(Contract N00014-85-K-0245)
(AD-A163149; TR-3) Avail: NTIS HC A02/MF A01 CSCL 07/4

The theory of block copolymer micelle formation formulated by Leibler, Orland and Wheeler is compared with the experimental results of Rigby and Roe obtained with mixtures of styrene-butadiene diblock copolymer and butadiene homopolymer. To facilitate the comparison, the theoretical expressions are recast in terms of the molecular volume v and the rms end-to-end distance r, thereby avoiding the use of the concept of the segment size a and the number of segment N per molecule. The calculated radii of the micelles show excellent agreement with the observed values. The theory predicts correctly the trend of change in the critical micelle cores to consist predominantly of styrene blocks, whereas the experimental results indicate that above a certain temperature that micelle cores become increasingly swollen with polybutadiene as the temperature is raised toward the dissolution temperature.
GRA

N86-25487# Department of the Navy, Washington, D. C.
BIS(PENTAFLUOROSULFUR)DIACETYLENE POLYMER THEREFROM AND PREPARATIONS THEREOF Patent
Thomas A. Kovacena, Ronald A. DeMarco, and Arthur W. Snow, inventors (to Navy) Issued 5 Nov. 1985 4 p
(AD-D012124; US-Patent-4,551,349; US-Patent-Appl-SN-562252; US-Patent Class-427-255.6) Avail: US Patent and Trademark Office CSCL 07/3

This invention pertains to a double substitution of pentafluorosulfur on diacetylene by a reaction of diacetylene with pentafluoro sulfur bromide, followed by a dehydrobromine action with potassium hydroxide. the substitutes diacetylene polymerizes in the liquid and gas phases. The polymer is useful as a coating and surface-treatment agent. GRA

N86-25488# Department of the Air Force, Washington, D.C.
PREPARATION AND POLYMERIZATION OF OXETHER-1 Patent
John M. Guimont, Gerald E. Manser, and Donald L. Ross, inventors (to Air Force) Issued 24 Dec. 1985 9 p
(AD-D012131; US-Patent-4,560,779; US-Patent-Appl-SN-400179; US-Patent-Class-549-510) Avail: US Patent and Trademark Office CSCL 07/3

The present invention provides a method for synthesizing a novel oxether-1 monomer by a two step reaction scheme which involves effecting a reaction between 3-methyl-3-hydroxymethyl oxetane and 1,1,1-trinitroethane to form an intermediate reaction product which in turn is reacted with methyl iodide to produce the oxether-1 monomer. The monomer is easily polymerized using conventional polymerization techniques to produce a poly (oxether-1) polyol useful as a binder component in smokeless propellants and explosives. GRA

N86-25489# Bell Telephone Labs., Inc., Murray Hill, N. J.
CRITICAL SCATTERING IN POLYMER MELTS
F. S. Bates, M. A. Hartney, and G. D. Wignall Oct. 1985 17 p
Presented at the International Conference on Neutron Scattering, Santa Fe, N. Mex., 19 Aug. 1985 Prepared in cooperation with Oak Ridge National Lab., Tenn.
(Contract DE-AC05-84OR-21400)
(DE86-003093; CONF-850871-21) Avail: NTIS HC A02/MF A01

Critical phenomena in two classes of polymer melts have been examined by small-angle neutron scattering (SANS); single component block polymers which undergo an order-disorder phase transition, and binary polymer mixtures which exhibit classical liquid-liquid phase separation behavior. A model set of 1,4-polybutadiene-1,2-polybutadiene diblock copolymers containing perdeuterated 1,4-polybutadiene blocks were investigated by SANS in the disordered state. The SANS spectra exhibit a peak in the scattering intensity which diverges at the ordering transition, in close agreement with mean-field theory. Binary blends of perdeuterated and protonated 1,4-polybutadiene homopolymers have been found to form regular solutions characterized by an upper critical solution temperature (UCST). Near the critical point,

these mixtures exhibit classical critical scattering as measured by SANS. The second set of results raises serious questions regarding the widely held assumption that deuterated and protonated polymers form ideal mixtures. DOE

N86-25490# Texas Technological Univ., Lubbock. Glass Research and Testing Lab.
STRENGTH OF NEW WINDOW GLASS PLATES USING SURFACE CHARACTERISTICS Final Report
D. C. Kanabolo and H. S. Norville Jul. 1985 122 p refs
(Grant NSF CEE-81-18214)
(PB86-140100; IDR/DOC-76D) Avail: NTIS HC A06/MF A01 CSCL 11B

The strength of new window glass plates under the action of uniform lateral pressure is discussed. Nine samples of new window glass plates of different geometries were tested to failure. The strengths of the samples are reported. Further, these strengths were evaluated relative to each other by using a common window plate geometry and a theory of fracture which employs parameters m and k which describe surface strength. Direct comparisons of experimental failure data illustrate the dependency of new window glass plate strengths on load duration. GRA

N86-25491# Texas Technological Univ., Lubbock. Glass Research and Testing Lab.
STRESSES IN LAYERED GLASS UNITS AND MONOLITHIC GLASS PLATES Final Report
S. R. Nagalla, V. G. Vallabhan, J. E. Minor, and H. S. Norville Oct. 1985 58 p refs Sponsored in part by Monsanto Polymer Products Co., St. Louis, Mo.
(PB86-142015; TTU-IDR-75D) Avail: NTIS HC A04/MF A01 CSCL 11A

The report examines in detail the structural mechanics behavior of thin, layered glass units under lateral presure relative to the behavior of monolithic glass plates of equal glass thickness. The theoretical study of specific geometries of layered glass units and monolithic glass plates provides interesting insights into the relative behaviors of these plates under lateral pressures. The study shows that layered glass units do not always develop larger principal tensile stresses than those found in monolithic glass plates of the same geometry and nominal thickness. GRA

N86-25492# Coors Porcelain Co., Golden, Colo.
CERAMIC TUBE MATERIALS AND PROCESSING DEVELOPMENT Topical Report, Feb. 1982 - Dec. 1984
K. E. Green, M. I. Rivkin, and D. W. Roy Jul. 1985 51 p
(Contract GRI-5081-231-0539)
(PB86-168762; GRI-85/0143) Avail: NTIS HC A04/MF A01 CSCL 11B

A cost-effective material/process has been developed for fabrication of SiC tubes which satisfy many of the structural and operataing environment requirements for high temperature heat recovery systems. Available property data plus cost projects are presented. Accomplishments and results include: extensive search for and final selection of lowest cost starting materials commercially available at the time; development of appropriate body formulations and processes to sucessfully utilize the respective low cost raw materials selection; development of an extrusion process (including tool design) to successfully fabricate and dry tubing; development of an optimal firing (siliconizing) cycle to adequately infiltrate the extruded tubes so they would yield measured properties which would meet or exceed the agreed upon specifications set down in concert with systems designers; and a final standardized process which should yield acceptable reaction bonded SiC tubing well within the target pricing in large quantities. GRA

N86-25493# SOHIO Engineered Materials Co., Niagara Falls, N.Y. Structural Ceramics Div.
CERAMIC COMPONENT MANUFACTURING TECHNOLOGY DEVELOPMENT Final Report, Sep. 1982 - Feb. 1985
I. Ruppel and J. Halstead Dec. 1985 67 p
(Contract GRI-5082-232-0635)
(PB86-157898; GRI-85/0276) Avail: NTIS HC A04/MF A01 CSCL 11B

Plastic binder extrusion of thin wall small to medium diameter finned and unfinned tubing has been developed to the stage that large quantities of tubing can be economically manufactured. Extrusion, binder removal, and sintering conditions have been optimized. Larger diameter, thicker wall tubing has been successfully plastic extruded at a rapid rate and significant progress has been made in the binder removal and sintering steps. Both continuous and periodic sintering are options depending upon size or geometry. Additional work with a larger scale periodic furnace will be required to confirm full scale capability. GRA

N86-25494# Southern Research Inst., Birmingham, Ala.
PREDICTIVE MODELS: PERMEATION OF POLYMERIC MEMBRANES BY ORGANIC SOLVENTS
G. D. Sides, D. P. Segers, E. F. Philpot, and A. S. Bhown Jan. 1986 10 p
(Contract EPA-68-03-3113)
(PB86-148459; EPA-600/D-86-021) Avail: NTIS HC A02/MF A01 CSCL 11J

Protective clothing (for example, gloves, aprons, masks, and protective ensembles) is often constructed in the form of barrier polymeric membranes. Permeation testing, which is used frequently to screen candidate polymers for use as protective barrier materials is expensive and time consuming, particularly when working with compounds as toxic and as subject to regulation as CW agents. The literature was reviewed and an initial approach to the prediction of the diffusivities and solubilities of organic solvents in polymers was developed. A brief review of the applicable theory is presented. Predicted diffusivities and solubilities for several solvent/polymer combinations are compared to experimental data. GRA

N86-25495# Southern Research Inst., Birmingham, Ala.
PREDICTIVE TEST METHODS: PERMEATION OF POLYMERIC MEMBRANES BY ORGANIC SOLVENTS
R. B. Spafford, G. D. Sides, and D. P. Segers Jan. 1986 86 p refs
(Contract EPA-68-03-3113)
(PB86-148111; EPA-600/D-86-022) Avail: NTIS HC A02/MF A01 CSCL 11J

As the result of screening elastomeric materials that may be suitable for formulating chemical-protective clothing, a simple test method has been developed that allows the prediction of the permeation of an organic solvent through a polymeric membrane. The test method, based on liquid-immersion absorption and desorption measurements, is simple, universal, and can be carried out by technicians with minimal training. GRA

N86-25496# Amerind Publishing Co. Pvt. Ltd., New Delhi (India).
PROTECTIVE COATINGS ON METALS, VOLUME 6
G. V. Samsonov 1984 321 p refs Transl. into ENGLISH of the book "Zashchitnye Pokrytiya na Metallakh, Vyp. 6" Kiev, USSR, Naukova Dumka, 1972 Prepared for National Science Foundation, Washington, D.C.
(PB86-155249; TT-76-52021-Vol-6) Avail: NTIS HC A14/MF A01 CSCL 11C

Review articles and brief communications devoted to the theory and practice of the formation of protective diffusion coatings on metals and alloys are given. Valuable information on different processes used in powder metallurgy, such as boriding, carbidizing, nitriding, aluminizing, chromizing, nickel plating and multicomponent diffusion coating is given. GRA

N86-25497# Environmental Protection Agency, Research Triangle Park, N.C. Office of Air Quality Planning and Standards.
SURFACE COATING OF PLASTIC PARTS FOR BUSINESS MACHINES: BACKGROUND INFORMATION FOR PROPOSED STANDARDS, DRAFT REPORT
Dec. 1985 268 p refs
(PB86-151784; EPA-450/3-85/019A) Avail: NTIS HC A12/MF A01 CSCL 11C

Standards of performance for the control of VOC emissions from affected facilities that perform exterior surface coating of plastic parts for business machines are being proposed under authority of Section III of the Clean Air Act. These standards would apply to each new, modified, and reconstructed spray booth in which plastic parts for business machines are surface coated and that commence construction on or after the date of proposed of the regulation. Background information and environmental and economic impact assessments of the regulatory alternatives considered in developing the proposed standards are given. GRA

N86-25498# Bureau of Mines, Rolla, Mo. Research Center.
PLASMA-SPRAYED IRON-BASE WEAR-RESISTANT COATINGS CONTAINING TITANIUM DIBORIDE, REPORT OF INVESTIGATIONS/1985
J. F. McIlwain and L. A. Neumeier 1985 25 p refs
(PB86-150901; BM-RI-8984; LC-85-600122) Avail: NTIS HC A02/MF A01 CSCL 11C

Cobalt-base hardfacing alloys used for wear resistance consist almost entirely of metals largely imported into the United States. As part of an overall research program to help alleviate this foreign dependency, the Bureau of Mines has been investigating an iron-base alloy system as a potential replacement for cobalt-base alloys for some uses. To ascertain the melting ranges, thermal analyses were made of cast heats of alloys. Powder alloys within this range of composition, prepared by mechanical alloying, were sized and applied to mild steel test coupons by nontransferred-arc plasma spraying. Abrasive and adhesive wear test data were compared to those of a plasma-sprayed cobalt-base alloy. GRA

N86-25499# Joint Publications Research Service, Arlington, Va.
JAPAN REPORT: SCIENCE AND TECHNOLOGY
9 Apr. 1986 43 p refs Transl. into ENGLISH of various Japanese articles
(JPRS-JST-86-009) Avail: NTIS HC A03/MF A01

Articles from foreign newspapers, periodicals and books and news agency transmissions and broadcasts on biotechnology and fiber optics are discussed. For individual titles, see N86-25500 through N86-25500.

N86-25500# Joint Publications Research Service, Arlington, Va.
TRENDS IN INFRARED OPTICAL FIBERS DISCUSSED
Shiro Takahashi *In its* Japan Report: Science and Technology (JPRS-JST-86-009) 9 Apr. 1986 p 30-40 refs Transl. into ENGLISH from Ceramics (Tokyo, Japan), Jul. 1985 p 595-600 (For primary document see N86-25499 16-27)
Avail: NTIS HC A03/MF A01

Optical fibers are playing an important role in the industry of optical transmission of information. The properties of optical fibers lend themselves to a wide range of applicatons, from transmission mediums which are measured in microns to kilometers. Optical fiber structures are discussed in relationship to light transmission loss. Applications of infrared optical fibers are also described. B.G.

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N86-25501# Mechanical Technology, Inc., Latham, N. Y.
EVALUATION OF ALTERNATE-FUELS PERFORMANCE IN AN EXTERNAL COMBUSTION SYSTEM Final Report
R. A. Battista and M. Connelly Dec. 1985 75 p refs
(Contract DE-AC01-84CE-50043)
(DE86-004901; DOE/CE-50043/1) Avail: NTIS HC A04/MF A01

As the economic attractiveness of many alternate fuels increases relative to gasoline, the viability of any future automotive power plant may soon depend on the ease with which these alternate fuels can be utilized. It is generally assumed that external-combustion engines are more tolerant of alternate fuels than internal-combustion engines. This study attempted to verify that assumption. The purpose of the Alternate-Fuels Performance Evaluation Program was to evaluate and compare the impact of burning six different liquids fuels in an external-combustion system. Testing was conducted in the automotive Stirling engine (ASE) combustion performance rig, which duplicates the external heat system (EHS) of a Stirling engine. The program expanded the range of fuels evaluated over previous studies conducted at Mechanical Technology Incorporated (MTI). The specific objective was to determine the optimal combustion stoichiometry considering the performance parameters of combustion efficiency, temperature profile, exhaust emissions, and burner wall temperature. DOE

N86-25502*# Rensselaer Polytechnic Inst., Troy, N.Y. Dept. of Mechanical Engineering.
EMISSION FTIR ANALYSES OF THIN MICROSCOPIC PATCHES OF JET FUEL RESIDUES DEPOSITED ON HEATED METAL SURFACES Final Report
James L. Lauer and Peter Vogel 30 May 1986 95 p refs
(Grant NAG3-205)
(NASA-CR-176786; NAS 1.26:176786) Avail: NTIS HC A05/MF A01 CSCL 21D

The relationship of fuel stability to fuel composition and the development of mechanisms for deposit formation were investigated. Fuel deposits reduce heat transfer efficiency and increase resistance to fuel flow and are highly detrimental to aircraft performance. Infrared emission Fourier transform spectroscopy was chosen as the primary method of analysis because it was sensitive enough to be used in-situ on tiny patches of monolayers or of only a few molecular layers of deposits which generally proved completely insoluble in any nondestructive solvents. Deposits of four base fuels were compared; dodecane, a dodecane/tetralin blend, commercial Jet A fuel, and a broadened-properties jet fuel particularly rich in polynuclear aromatics. Every fuel in turn was provided with and without small additions of such additives as thiophene, furan, pyrrole, and copper and iron naphthenates. B.G.

N86-25503# Morton Thiokol, Brigham City, Utah.
MINUTEMAN STAGE 3 OPERATIONAL SURVEILLANCE PROGRAM 7-YEAR TESTING BONDLINE AGING STUDY
Michael R. Knight Dec. 1985 133 p refs
(Contract F42600-86-C-0001)
(AD-A164288; TWR-32333) Avail: NTIS HC A07/MF A01 CSCL 21/9

The program objective is to provide material properties aging data at silo conditions (70 + or - 5 F, 50 + or - 5 percent RH) for liner bond strength, ANB-3066 propellant, SD-851-2 liner, and V-45 insulation from selected locations of three Minuteman Stage III motors. These data are to be used to relate the conditions of the dissected motors to those of operational motors (via excise samples) and to compare and adjust the age of all of these to the Stage II nominal liner degradation curve. This report contains results of the yearly material properties testing of Stage III motor segments in the 12-year bondline aging study. Also reported are the results obtained in the continued testing/monitoring of Motor TC 30024 (LRSLA Simulated Aging Test No. 3), as are the second year results of tests upon the bondline materials and propellants obtained from dissected stage III segments of Motor TC 30072. The twelve-year bondline aging study uses segments removed from three in-process reject motors which were cast in 1971 and were rejected due to apex voids. Segments maintained at silo conditions are being used to track bondline aging of Stage III motors with testing of material properties being performed at one-year intervals to 1990. GRA

N86-25504# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CALCULATION OF THE ENERGETIC CHARACTERISTICS OF TN IN COMPOSITE SOLID PROPELLANTS
Zhang Wei and Tian Deyu 23 Jan. 1986 19 p refs Transl. into ENGLISH from Yuhang Xuebao (China), no. 2, 1984 p 84-90

(AD-A164310; FTD-ID(RS)T-0961-85) Avail: NTIS HC A02/MF A01 CSCL 19/1

This paper introduces the physiochemical properties of a new organic oxidizer - 2, 3, 5,6 -tetranitrato - 1,4 Dinitropiperazine (TN). Based on White's minimization of Gibbs free energy principle, its energetic characteristics in solid propellants are investigated with the aid of a computer. The results indicate that the theoretical specific thrust of a composite solid propellant consisting of TN, aluminum powder (Al) and HTPB can reach 276 sec, approximately 10 sec. higher than the Ap, Al and HTPB series of propellants. This demonstrates that TN is indeed a high energy oxidizer. In addition, characteristics of smokeless propellants consisting of TN and HTPB are being studied preliminarily in this paper. GRA

N86-25505# Coordinating Research Council, Inc., Atlanta, Ga.
THE 1984 CRC (COORDINATING RESEARCH COUNCIL) OCTANE NUMBER REQUIREMENT SURVEY
Dec. 1985 272 p refs
(AD-A164454; CRC-544) Avail: NTIS HC A12/MF A01 CSCL 21/4

In the thirty-eighth annual statistical survey of current model vehicles conducted by the Coordinating Research Council, Inc., test data were obtained on 407 1984 model vehicles, including 345 US vehicles and 62 imported vehicles. Eighteen laboratories participated in this Survey. Maximum octane number requirements were determined by testing under part-throttle conditions, as well as at maximum-throttle. Requirements are expressed as the Research octane number, Motor octane number, and (R+M)/2 octane number of the reference fuel producing knock which was recurrent and repeatable at the lowest audible level. A new definition of borderline knock was used in this Survey; this change may have affected the 1984 Survey results relative to previous years' Surveys. Estimated octane number requirements for the US vehicles are weighted in proportion to the 1984 vehicle model production figures and, for the imported models, in proportion to import sales volume in the United States. Author (GRA)

N86-25506# Materials Research Labs., Ascot Vale (Australia).
DETERMINATION OF SHOCK INITIATION AND DETONATION CHARACTERISTICS OF PE4 IN PROOF TEST GEOMETRIES
M. C. Chick and L. A. Learmonth Nov. 1985 20 p refs
(AD-A164484; AD-E900539; MRL-R-979) Avail: NTIS HC A02/MF A01 CSCL 19/1

PE4 is a white, soft plastic explosive. It is the standard service explosive for demolition and explosive ordnance disposal. The basic ingredients are: RDX grade B (boiled and milled) - 88%; Plasticizer (PE4 grease) - 11%; Pentaerythritol di-oleate, PEDO 1%. Various shock initiation and detonation properties relevant to the detonation proof testing of PE4 are reported and used to assess the results of a survey of over 450 proof tests on production PE4 for the five year period up to 1981. Conclusions from the investigation include: high moisture content can cause failures; large variations in plasticizer content (up to double) do not cause failures; voids in the PE4 adjacent to and under the detonator do not cause failure; a void across the complete diameter of the PE4 test sample adjacent to the steel plate can cause partial failures; the L2A1 detonator has more than sufficient power to detonate the PE4; full detonation is achieved within the PE4 and the test geometry is several orders of magnitude greater than the critical diameter to support detonation. GRA

N86-25507# Southwest Research Inst., San Antonio, Tex. Fuels and Lubricants Research Facility.
REAL-TIME QUALITY CONTROL OF ANTIMISTING KEROSENE (AMK) Final Report, Feb. 1983 - Apr. 1985
Richard J. Mannheimer Oct. 1985 67 p
(Contracts DAAK70-85-C-0007; DAAK70-82-C-0001)
(AD-A163157; BFLRF-187; FAA/CT-85/5) Avail: NTIS HC A04/MF A01 CSCL 21/4

This report discusses the results of a program to develop real-time quality-control tests for antimisting fuels. In Phase 1, die-swell and torsional balance experiments were performed to compare the shear and normal stresses developed by AMK (0.3 percent FM-9 + glycol/amine in Jet A) and 0.1 percent ARCO in Jet A. In phase 2, experiments were conducted to determine the effect of polymer concentration and methods of blending on the rheological properties of AMK. GRA

N86-25508# California Univ., Berkeley. Dept. of Chemistry.
LASER-INDUCED FREE RADICAL REACTIONS Final Report, Feb. 1982 - Jan. 1985
J. H. Clark Oct. 1985 42 p refs
(Contract GRI-5081-260-0568)
(PB86-168788; GRI-85/0241) Avail: NTIS HC A03/MF A01 CSCL 21D

The solvation dynamics of electronically excited 3-aminophthalimide and 4-aminophthalimide were investigated using picosecond, time-resolved, emission spectroscopy. The results show that: (1) the rate-limiting process for the solvation dynamics of these molecules is the dielectric relaxation of the surrounding solvent molecules; (2) the excited-state solvation dynamics can be predicted from the known longitudinal dielectric relaxation rates of the solvent; and (3) the solute molecules are static while the solvent reorganizes around them. These findings constitute the first direct measurements of solvation dynamics that can be directly compared with the predictions of the various theoretical treatments of the solvation process. GRA

N86-25509# Florida Univ., Gainesville. Inst. of Food and Agricultural Sciences.
METHANE FROM BIOMASS AND WASTE Annual Technical Progress Report, 1984
W. H. Smith Jan. 1985 230 p
(Contract GRI-5880-323-0423)
(PB86-156130; GRI-85/0203) Avail: NTIS HC A11/MF A01 CSCL 21D

The production of methane from biomass and waste is discussed. Growth and yield data on a wide variety of plant species and varieties in eight plant resource groups are reported on promising species selected from extensive screening trials of over 150 species. Research results are summarized from water hyacinth and Napiergrass-model species showing yields in excess of 20 dry tons/acre/year. Over 1000 samples were bioassayed for methane yields and the variables affecting conversion to methane were defined. Results emphasize the Multiphase Anaerobic Digestion System (MADS), an innovative design that employs leached/packed beds. A comprehensive information management system and an integrated methane from biomass system model (BIOMET) used for research evaluation and program management are described. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N86-25510# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering Div.
USING A COMPUTER-AIDED DRAFTING SYSTEM TO AID IN ENGINEERING AND FABRICATION
J. Millaud, F. Goulding, and P. Salz May 1985 10 p Presented at the 4th DOE Workshop on Computer Aided Engineering, New York, N.Y., 10-11 Oct. 1985
(Contract DE-AC03-76SF-00098)
(DE86-004097; LBL-19692; CONF-851060-2) Avail: NTIS HC A02/MF A01

The generation of schematics and artwork on CAD workstations yields a large amount of numeric data that can be used in many ways. Standard by-products are connection lists, photoplot files and drill files. Using open-ended software allows for more information to be retrieved and used for various purposes in engineering and fabrication. DOE

N86-25511# Applied Research Associates, Inc., Albuquerque, N. Mex.

FUNDAMENTAL PROPERTIES OF SOILS FOR COMPLEX DYNAMIC LOADINGS. DEVELOPMENT OF A THREE INVARIANT CONSTITUTIVE MODEL Final Report, 1 Aug. 1980 - 31 Jul. 1984

Douglas Hall Merkle and William Christopher Dass 22 Apr. 1985 104 p

(Contract F49620-80-C-0088)

(AD-A164206; Rept-5230; AFOSR-85-1232TR) Avail: NTIS HC A06/MF A01 CSCL 08/13

This study sought to develop a general soil stress-strain model which can be used to solve a wide range of soil dynamics problems. The approach used was to review existing soil constitutive models used to predict the response of soil masses to complex dynamic loads, and then formulate a new model for that purpose. Eight existing soil dynamic stress-strain models were studied. The Lade model was selected as the best point of departure for developing a new soil stress-strain model for complex dynamic loading, because of its accuracy and flexibility in representing soil stress-strain behavior, ease of parameter determination, and ease of developing intuition for parameter physical significance and accuracy. The new conic model is so called because its principal mathematical surfaces are conic sections. The computer code used to exercise all nine soil constitutive models under eleven stress and strain paths is called the Soil Element Model (SEM). It can be incorporated in large finite difference or finite element codes for analyzing the response of soil masses to complex dynamic loads. The conic model performs well over a wide range of loading conditions. The parameters are determined in a straightforward manner, and the model reflects the influence of the intermediate principal stress on shear strength through a shear failure surface involving three independent stress invariants: the first total stress invariant and the second and third deviator stress invariants. GRA

N86-25512# Applied Research Associates, Inc., Albuquerque, N. Mex.

FUNDAMENTAL PROPERTIES OF SOILS FOR COMPLEX DYNAMIC LOADINGS. DEVELOPMENT OF A THREE INVARIANT CONSTITUTIVE MODEL: APPENDICES A-W Final Report, 1 Aug. 1980 - 31 Jul. 1984

Douglas Hall Merkle and William Christopher Dass 22 Apr. 1985 609 p

(Contract F49620-80-C-0088)

(AD-A164207; Rept-5230-APP-A/W; AFOSR-85-1232-APPTR) Avail: NTIS HC A99/MF A01 CSCL 08/13

Topics in these appendices to AD-A164 206 include: stress analysis; Cayley-Hamilton invariant formulations; octahedral plane plots; basic equations of elastoplasticity; vector representation of a general stress or strain state; incremental flexibility matrix for stress control; incremental stiffness matrix for strain control; incremental deformation mode logic for stress control; incremental deformation mode logic for strain control; elastic stress-strain equations; special equations for the triaxial test; transient response of a three element viscoelastic model; Young's modulus for a hyperbolic stress-strain curve; a hyperbolic expression for Poison's ratio; hyperbolic model for cyclic simple shear; yield surface violation correction for an elastic-perfectly plastic model; AFWL engineering model incremental plastic response; drained and undrained cap models and computational algorithms; Lade model cross sections and parameter determination; conic model cross sections and parameter determination. GRA

N86-25513# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Structures Lab.

EPOXY-RESIN GROUTING OF CRACKS IN CONCRETE Final Report, Jun. 1983 - Dec. 1984

Dennis L. Bean Dec. 1985 44 p refs

(AD-A164306; WES/MP/SL-85-18) Avail: NTIS HC A03/MF A01 CSCL 11/9

Cracked concrete can be successfully repaired by epoxy-resin grouting if it is performed properly, using the correct materials. Epoxy resins can be pressure grouted in cracks of different sizes in concrete at different temperatures, even if the concrete is damp or under water. A literature search was conducted and manufacturers were contacted to obtain the latest information about materials, methodology, and equipment for epoxy-resin grouting. Author (GRA)

N86-25514# Maryland Univ., College Park. Lab. for Numerical Analysis.

UNCERTAINTIES IN ENGINEERING DESIGN. MATHEMATICAL THEORY AND NUMERICAL EXPERIENCE Final Report

Babuska, I. Aug. 1985 39 p refs

(Contract N00014-85-K-0169)

(AD-A164371; BN-1044) Avail: NTIS HC A03/MF A01 CSCL 20/11

Shape optimization in structure mechanics is the center of research and applications. Many papers and books dealing with this subject appeared and special conferences dealt with these problems. The research is directed toward theoretical questions as existence and characterization of the optimal design, bounds for the optimized values, numerical treatment of the optimal design problems, etc. This paper addresses the problem of the reliability of the conclusions based on computational analysis and their relation to the problems of the optimal design. The problem of optimal design consists--in principle--in the comparison of the solutions of states from the set S of admissible states (for example, solution of the problems from the set of admissible domains) and the selection of the optimal state (e.g. the domain) for the engineering design. It is obvious that such a selection can be successful only if the solution of every state is uniformly reliable with respect to the entire set S. This requirement creates a serious difficulty because we are used to solve in practice numerically the simplified mathemtical model formulation of the problem and have experience only with small limited set of practical problems. GRA

N86-25515# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.

EQUATIONS FOR NONBONDED CONCRETE OVERLAYS Final Report

Y. T. Chou Sep. 1985 37 p refs

(AD-A163173; WES/MP/GL-85-25) Avail: NTIS HC A03/MF A01 CSCL 13/13

The nature of the design equations for the nonbonded concrete overlays currently used by the US Army Corps of Engineers was examined and the original source of the equation was also examined. Using simple mechanics, new overlay equations were developed which are suitable for different thicknesses and elastic properties in the overlay and base concrete slabs. The difference in the computed overlay thickness between the new and existing equations is not large when the overlay thickness is equal to or greater than the base slab. The difference can become excessive when the overlay thickness is much less than that of the base slab. The new equations were compared with the finite element computer program for concrete overlays with various combinations of slab thickness, elastic property, and subgrade modulus. The comparisons were very favorable, indicating that the overlay equations developed in this report are analytically correct. It was difficult to judge whether the new equations are superior to the existing equation. This conclusion was expected because for all the seven test sections analyzed, the overlay thicknesses were either equal to or greater than those of the base slabs. GRA

N86-25516# Department of the Air Force, Washington, D.C.

IMPROVED BOLT FRAME CONSTRUCTION Patent Application

D. Q. Marshall, inventor (to Air Force) Filed 14 Nov. 1985 13 p

(AD-D012087; US-Patent-Appl-SN-798042) Avail: NTIS HC A02/MF A01 CSCL 13/5

The coupling together of the ends of two sections of pipes is accomplished using a pair of externally mating flanges, a plurality of nut and bolt assemblies, and a split, u-shaped positioning ring which surrounds the mating flanges. The flanges each surround the peripheral surface adjacent to a collar at the ends of the pipe sections, and have a plurality of spaces radial notches around their perimeter. The positioning ring has pairs of inwardly protruding

tabs spaced about its circumference to align with the radial notches of the two flanges. Each pair of tabs has an orifice holding the loosely preassembled nut and bolt assemblies which are all slid into their corresponding notches in the flanges at once when the clamping ring is placed over the flanges. Subsequent tightening of the nut and bolt assemblies press the mating flanges together against a seal placed between them to prevent leakage from the coupling. Author (GRA)

N86-25517# Department of the Air Force, Washington, D.C.
MOUNTING DEVICE Patent
Richard L. Long, inventor (to Air Force) Issued 17 Dec. 1985 5 p
(AD-D012110; US-Patent-4,559,101; US-Patent-Appl-SN-532862; US-Patent-Class-156-359) Avail: US Patent and Trademark Office CSCL 13/5

An apparatus for demountably mounting a device to a lightweight, brittle structure, such as high modulus structures or composite structures is discussed. The apparatus is comprised of a baseplate with means for attaching the device to the baseplate, at least one layer of heat-activatable material, an electrical heater, an optical heat sensor, terminals for applying electrical current to the heater and terminals for connecting a temperature indicator to the heat sensor. GRA

N86-25518# Department of the Air Force, Washington, D.C.
METHOD FOR VACUUM BAKING INDIUM IN-SITU Patent
Joseph A. Adamski, inventor (to Air Force) Issued 17 Dec. 1985 6 p
(AD-D012113; US-Patent-4,559,217; US-Patent-Appl-SN-547611; US-Patent-Class-423-299) Avail: US Patent and Trademark Office CSCL 20/12

This invention pertains to a method for producing highly pure indium for subsequent utilization as a reaction component in the synthesis of polycrystalline indium phosphide which includes the step of heating raw indium under vaccuum in an open ended quartz ampoule to a temperature in excess of 850 C, followed by the step of sealing the ampoule while simultaneously maintaining the vacuum in the interior of the ampoule. GRA

N86-25519# United Nations Industrial Development Organization, Vienna (Austria).
OPTICAL FIBER PRODUCTION
E. Bonek, B. Furch, and H. Otruba Jul. 1985 284 p refs
(PB86-140084; UNIDO/IS.542; V-85-29313) Avail: NTIS HC A11/MF A01 CSCL 05C

A report of the U.N. Industrial Development Organization on Optical fiber production includes the following topics: Basics of optical communication; Technology trends; Classification of fibers - fiber standards; Production of optical fibers; Production of optical cables; Testing and quality control; Requirements; Capital investment; Economics of production; Potential suppliers of equipment and technology; Fiberoptics markets - characteristics and trends; Position of developing countries; and recommendations. GRA

N86-25520# National Bureau of Standards, Gaithersburg, Md.
NATIONAL CONFERENCE ON WEIGHTS AND MEASURES (70TH), 1985 Final Report
A. D. Tholen, L. E. Barbrow, and A. P. Heffernan Nov. 1985 267 p Conference held in Washington, D.C., 14-19 Jul. 1985
(PB86-150232; NBS/SP-704; LC-26-27766) Avail: NTIS HC A12/MF A01 CSCL 14B

The proceedings of the 70th Annual Meeting of the National Conference on Weights and Measures are given. Reports by the several standing and annual committees of the Conference comprise the major portion of the publication. Included also are papers presented by Conference officials and others. Major issues discussed at the Conference included a new Scales Code to be effective January 1, 1986, method of sale of commodities, labeling of gasoline-alcohol blends, national type evaluation, and development of training materials. GRA

N86-25521# Brookhaven National Lab., Upton, N. Y.
SPRAYABLE ELECTRICALLY CONDUCTIVE POLYMER CONCRETE COATINGS Final Report, Mar. 1984 - Jun. 1985
J. J. Fontana, W. Reams, and D. Elling Aug. 1985 30 p refs
(Contract DTFH61-84-Y-30331)
(PB86-157542; FHWA/RD-85/102) Avail: NTIS HC A03/MF A01 CSCL 13C

A sprayable electrically conductive polymer concrete coating for vertical and overhead applications has been developed. The technology, in conjunction with impressed current cathodic protection, can be used to prevent corrosion of the embedded reinforcing steel in concrete girders, piers, columns, and beams. A formulation of an electrically conductive polymer concrete, which holds the conductive filler in suspension and can be sprayed in thin uniform coatings, was developed. GRA

N86-25522# Pennsylvania Dept. of Transportation, Harrisburg. Bureau of Bridge and Roadway Technology.
COMPARISON OF METHODS TO RETARD REFLECTIVE CRACKING IN BITUMINOUS CONCRETE USING FABRICS AND FIBERS: CONSTRUCTION AND EARLY PERFORMANCE REPORT Report, Jun. 1984 - Aug. 1985
D. A. Maurer Sep. 1985 68 p refs Sponsored by Federal Highway Administration
(PB86-153087; Rept-83-8; FHWA/PA-85/015) Avail: NTIS HC A04/MF A01 CSCL 13B

The primary purpose of the project is to determine whether any of various treatments, using geotechnical fabrics and fibers, will significantly retard reflective crack formation in an asphaltic concrete overlay. Four paving fabrics, one asphalt/fiber membrane and one fiber-reinforced asphalt concrete, are the treatment alternatives being evaluated. All treatments are being compared with each other and a control section without treatment to determine relative performance, considering cost, ease of placement or adaptability to normal overaly practice, and ability to resist reflective cracking. Field montioring is being maintained for three years to determine overall and relative performance of each treatment. GRA

N86-25523# Utah Dept. of Transportation, Salt Lake City. Research and Development Unit.
CRACK SEALING METHODS AND MATERIALS FOR FLEXIBLE PAVEMENTS Final Report
M. C. Belangie and D. I. Anderson May 1985 82 p refs Sponsored by Federal Highway Administration
(PB86-152345; UDOT-MR-85-1; FHWA/UT-85/1) Avail: NTIS HC A05/MF A01 CSCL 13B

The over forty-four lane miles of test site to gather up to three years of comparative performance data on thirteen crack sealants. The data indicates that the more durable, high ductility materials when applied in a band-aid configuration can be expected to give significantly better performance than the lower ductility materials used by the Utah DOT prior to 1983. Evaluation of laboratory tests indicate that Bond, Ductility and Force Ductility Tests were useful in predicting the cold temperature performance of crack sealants. The Flow Test was found to be effective in eliminating sealants that tracked or pulled-out during hot weather. Both acceptance and lot laboratory testing are recommended. The report includes specifications for material and procedures, and makes recommendations for modifications to both equipment and sealing practice. GRA

N86-25524# Amerind Publishing Co. Pvt. Ltd., New Delhi (India).
THERMODYNAMICS AND HEAT TRANSFER IN FIRE FIGHTING
P. N. Romanenko, Y. A. Koshmarov, and M. P. Bashkirtsev 1985 483 p refs Transl. into ENGLISH of the book "Termodinemika i Teplootdacha v Pozharnom Dele" Moscow, USSR, USSR Ministry of Internal AFfairs, 1977 Prepared for National Bureau of Standards, Gaithersburg, Md.
(PB86-155181; TT-81-52193) Avail: NTIS HC A21/MF A01 CSCL 13L

The book presents the fundamental principles of thermody-

namics and heat transfer with particular reference to their application in problems related to fire prevention. Special attention is given to the study of unsteady heat transfer, radiant heat transfer (including radiation from flames to the surrounding), thermodynamic analysis of the growth of fires and theoretical modeling of fires in building. GRA

N86-25525# Joint Publications Research Service, Arlington, Va.
USSR REPORT: ENGINEERING AND EQUIPMENT Abstracts Only
14 Mar. 1986 123 p Transl. into ENGLISH from various Russian articles
(JPRS-UEQ-86-006) Avail: NTIS HC A06/MF A01

Literature abstracts addressing topics in various areas of engineering are compiled. Specific subject categories include surface transportation, fluid dynamics, nuclear and non-nuclear energy, marine technology, optical and optoelectronic devices, turbine design, and industrial technology. For individual titles, see N86-25526 through N86-25538.

N86-25526# Joint Publications Research Service, Arlington, Va.
AUTOMATED MULTIDIMENSIONAL ANALYZER BASED ON SM-3 KAMAK Abstract Only c19
R. Kupchak, A. Soltan, N. K. Skobelev, M. Levitovich, A. Yankovski, and G. Baluka *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 1-2 refs Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow), no. 2, Mar.-Apr. 1985 p 203-206 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

A device for rotating a detector in open space that has been developed for the scanning electrostatic analyzer carried aboard the Interkosmos-18 satellite is described. The device incorporates a moving head that holds the detector, a magnetoelectric drive consisting of a permanent magnet and stationary coils that are coupled to the head, a slotted code disc that fits in a yoke that employs six pairs of light-emitting diodes and photodiodes, electronic angle-of-revolution display circuit, and a drive control. Negative feedback is employed to stabilize and limit the amplitude. The system consumes less than 10 mW. While in operation aboard Interkosmos-18, the period of the device remained constant to within + or - 0.4%; within 20 days of continuous operation this figure dropped to 18%. The amplitude of the oscillations increased by several degrees over 20 days, apparently due to gradual reduction of the friction in the bearings. Author

N86-25527# Joint Publications Research Service, Arlington, Va.
SELECTIVE COATINGS FOR SOLAR-TO-THERMAL ENERGY CONVERTERS Abstract Only c19
M. I. Umarova *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 20 refs Transl. into ENGLISH from Izv. Akad. Nauk Tadzhiksoy SSR Otd. Fiz.-Mat., Fiz. i Geol. Nauk (USSR), no. 2 (92), Apr. - Jun. 1984 p 61-71 Previously announced as N85-28144 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

The possibility of obtaining a two layer selective coating consisting of a ferrous oxide and a transparent conducting layer by pulverization on a foil substrate in a unified technological process was investigated. In the pulverization method, a solution containing the chemical elements needed to produce the required layer was sprayed onto a heated substrate. The characteristics of a CuO + SnO2 selective coating were investigated in field tests under high altitude conditions, and indicate that this coating is suitable for solar energy converters. The coating is easy to produce, low in cost and resistant to solar radiation. Author

N86-25528# Joint Publications Research Service, Arlington, Va.
PERIODIC OPTICAL FARADAY-EFFECT CHOPPER Abstract Only c44
N. I. Gavrilov, A. M. Godes, V. Kh. Krupkin, A. L. Levit, and V. M. Ovchinnikov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 58 refs Transl. into ENGLISH from Optiko-Mekhanicheskay Promyshlennost (USSR), no. 1, Jan. 1985 p 17-19 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

A Faraday effect optical chopper is described which controls radiation at the 1.06 micron wavelength in the periodic mode with repetition rates up to 100 Hz. The chopper includes a Faraday rotation, an air-core solenoid which produces a magnetic induction of 0.5-1 T for 45 deg. rotation of the polarization plane, and a 3.6 nF capacitor bank which discharges into the solenoid in pulses. The capacitor bank is energized from a 220/800 V - 50 Hz transformer through a diode-rectifier bridge. The rotation angle is proportional to the square root of the capacitor discharge energy and inversely proportional to the square root of the solenoid radius, but does not depend on the number of solenoid turns, with a constant coefficient equal to the magnetic permeability of the medium multiplied by the Verdet constant and with a variable coefficient which depends on the ratio of solenoid radius to solenoid length and the ratio of rotator rod length to solenoid length. The normalized rotation angle increases from zero to unity as the relative length of the rotator rod increases, reaching unity at a smaller relative rod length as the relative solenoid radius decreases. The relative radial nonuniformity of the rotation angle, referred to the rotation angle at the solenoid axis, also depends on those two ratios: increasing monotonically as the relative solonoid radius increases but increasing with a sharp peak and then decreasing to zero as the relative rotator rod length increases beyond the solenoid length. M.G.

N86-25529# Joint Publications Research Service, Arlington, Va.
ELASTOHYDRODYNAMIC PROBLEM FLUID FLOWING TOWARD CRACK IN POROUS MEDIUM Abstract Only c74
A. V. Baluyeva and A. F. Zazovskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 74 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhanika Tverdogo Tela (USSR), no. 5, Sep.-Oct. 1985 p 157-166 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

A steady-state flow of a fluid toward a single crack in a boundless porous elastic medium is analyzed, specifically a discal crack whose hydraulic permeance depends on its opening. The corresponding problem of elastohydrodynamics is formulated in two approximations, either for a laminar flow according to Boussinesq's law or for an infinite local permeance but a reduced filtration area as a result of partial or complete closure of the crack surface with formation of overlap zones; both approximations yield a nonmonotonic pressure dependence of the flow rate. The problem is formulated in accordance with the Bio theory of consolidation in a half-space, whereupon its solution is sought with the aid of the generalized Gibson representation and the Hankel transformation. The resulting system of nonlinear integral equations can be solved by the method of successive approximations. In the case of filtration with overlap zones, the problem splits into two, one in the theory of elasticity with body forces produced by pressure gradients and one in the theory of filtration. Ignoring the finiteness of the local permeance makes it possible to solve these two problems sequentially rather than only simultaneously. They are solved by the variational-difference method. Numerical calculations have been made, assuming a unity filtration coefficient, for a horizontal crack with elliptical cross-section in the ground and a vertical crack with circular cross-section in bedrock. Author

N86-25530# Joint Publications Research Service, Arlington, Va.
STABILITY CHARACTERISTICS OF SUPERSONIC BOUNDARY LAYER AND THEIR RELATION TO TRANSITION POINT BETWEEN LAMINAR AND TURBULENT FLOW Abstract Only c34
V. I. Lysenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 75 refs Transl. into ENGLISH from Izv. Sibirksogo Otd. Akad. Nauk SSSR: Ser. Tekh. Nauk (USSR), no. 4, iss. 1, Mar. 1985 p 79-86 Original language document was announced in IAA as A85-42123 (For primary

document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

The transition point between laminar and turbulent flow in a compressible boundary layer has so far been predicted by approximate methods, but neither those based on the linear theory of stability nor the e(n)-method with n= 2.7 are adequate for supersonic boundary layers. This deficiency can be remedied by calculations based on the system of three partial differential equations describing the flow of a compressible heat conducting gas in a boundary layer with a pressure gradient accompanying heat transfer, in accordance with the standard program for calculating the perturbation buildup coefficients under such conditions. These coefficients are determined from the system of four equations of stability in the Dan-Lin approximation and with the Reynolds number is defined in terms of the transverse or normal scale. Results obtained for conical surfaces in winter (300 K) and in winter (-50 C) with thermal insulation underneath by the Schubauer-Skramstead-Smith method with e(10) and e(9), respectively, agree closely with experimental data, which also involve the angle between perturbation wave and main flow as well as other relevant perturbation parameters such as the wave number at supersonic velocities with the Mach number up to N sub M =4. Author

N86-25531# Joint Publications Research Service, Arlington, Va.
EFFECT OF DIRECTIONAL INJECTION AND SUCTION ON CHARACTERISTICS OF LAMINAR BOUNDARY LAYER WITH NEGATIVE PRESSURE GRADIENT Abstract Only c02
M. N. Kiselev, V. P. Motulevich, and E. D. Sergiyevskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 75-76 refs Transl. into ENGLISH from Izv. Sibirskogo Otd. Akad. Nauk SSSR: Ser. Tekh. Nauk (USSR), no. 4, iss. 1, Mar. 1985 p 94-98 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

Steady laminar flow of an incompressible fluid along a semiinfinitely large plane surface with injection or suction through pores in that surface is analyzed, assuming constant thermophysical properties and a Reynolds number not far below critical. Upon introduction of the flow function in Liese-Dorodnitsyn variables and the pressure gradient, the corresponding two equations of momentum and energy for a self-similar flow are solved for the appropriate velocity and temperature boundary conditions at the outer edge of the boundary layer. From the solution to this boundary-value problem it is possible to determine the two most important integral characteristics of such a boundary layer, namely the skin friction and thermal flux. A solution has been obtained on the YeS-1022 computer by the numerical method of elimination with a constant integration step and with an 800-mesh grid. The results indicate a decrease of skin friction and an intensification of heat transfer with increasing tangential velocity component during injection or suction with a negative pressure gradient, because then both the hydrodynamic and thermal thicknesses of the boundary layer decrease less than does the velocity head. During injection or suction with a quasi-zero pressure gradient, both thicknesses of the boundary layer decrease more than does the velocity head. Author

N86-25532# Joint Publications Research Service, Arlington, Va.
WAVE DRAG OF SOLIDS OF REVOLUTION WITH FRONTAL SEPARATION ZONE IN SUPERSONIC STREAM Abstract Only c02
I. A. Belov, S. A. Isayev, A. Yu. Mitin, and V. N. Konovalov *In its* USSR Report: Engineering Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 77-78 refs Transl. into ENGLISH from Izv. Sibirskogo Otd. Akad. Nauk SSSR: Ser. Tekh. Nauk (USSR), no. 4, iss. 1, Mar. 1985 p 47-51 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

The wave drag of bodies of revolution with a frontal separation zone, specifically a cylinder behind a disk in a parallel configuration, can be calculated on the basis of exact Navier-Stokes or Reynolds equations which include viscosity. This requires a high-speed computer with large memory capacity. It has been, instead, calculated on the basis of difference solutions to the corresponding Euler equations applicable to turbulent flow with shock waves as well as to circulation flow between bodies. The validity of this approximate model is established by comparing the numerical solution with experimental data, of particular interest being the still largely unexplored supersonic range with the Mach number of quiescent flow N sub Moo >2. The model euqations were solved numerically by the Godunov straight-through method with stabilization of the unsteady finite-difference scheme, for a wide range of geometrical dimensions and the N sub Moo = 2 to 6 range of the Mach number. Experiments were performed in a wind tunnel over the N sub Moo = 1.8 to 4.15 range of Mach number and a wide range of cylinder-disk configurations. Theoretical and experimental values of the wave drag agree rather closely, except for a small disk near the cylinder. The discrepancy in this case is attributable to inaccuracy of the mathematical model, which accounts neither for artificial diffusion nor for the hysteresis effect in flow restructurization characteristic of a body with protruding spike. Author

N86-25533# Joint Publications Research Service, Arlington, Va.
TRANSIENT AERODYNAMIC CHARACTERISTICS OF FOIL IN STREAM WITH SEPARATION FLOW NEAR WAVY WALL Abstract Only c02
L. V. Mikhaylova *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 78 refs Transl. into ENGLISH from Izv. Sibirskogo Otd. Akad. Nauk SSSR: Ser. Tekh. Nauk, no. 4, iss. 1, Mar. 1985 p 56-60 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

Separation flow of an ideal incompressible fluid around a thin foil with a generally curvilinear profile is considered when the foil moves broadside horizontally at a constant velocity above a horizontal wall with wavy upper surface and remains forward tilted at a constant angle. The corresponding boundary-value problem for the velocity potential with a vortex sheet originating at the leading upper edge and trailing behind the trailing lower edge is formulated in a system of nonlinear singular integral equations for the coordinates and the intensities of vortex formations. This system is first reduced to a linear one, by successive linearizations for small time intervals, and then solved numerically after it has been reduced by the method of discrete vortices to a system of algebraic equations. The aerodynamic loads on the foil are evaluated through the Cauchy-Lagrange integral. The procedure has been applied to a foil of rectilinear profile, a plate, moving from rest at a constant horizontal velocity above a wall with a sinusoidal upper surface. The vortex formation immediately above the plate becomes aperiodic when the Strohal number is still small (N sub Sh = 1.047) and then becomes altogether sparse when the Strohal number is large (N sub SH = 6.28). In the latter case the aerodynamic characteristics, particularly the lift coefficient, are determined by the shape of the surface profile underneath as long as the mean altitude of the plate above the wall surface remains much smaller than the plate width. As the altitude fluctuates while the plate moves across the surface ripple, the lift coefficient cycles with hysteresis which weakens as the Strohal number decreases. Author

N86-25534# Joint Publications Research Service, Arlington, Va.
HYPERSONIC FLOW AROUND A WING AT LARGE ANGLES OF ATTACK WITH DETACHED COMPRESSION JUMP Abstract Only c02
V. N. Golubkin and V. V. Negoda *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 87 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhanika Zhidosti i Gaza (USSR), no. 3, May-Jun. 1985 p 149-157 Original language document was announced in IAA as A85-44788 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

A study is made of the flow around a thin delta wing with finite delta angle at large angles of attack. A theory presented in earlier works describes a conical flow with a compression jump

attached only at the apex of the delta wing. Possible conditions of flow around the wing at large angles of attack are classified. The results indicate that the asymptotic theory of the shock layer for a wing of finite span is the most general, since it describes all three qualitatively different flow conditions; with a compression jump attached to the leading edge, attached only to the apex or completely detached. A general solution is obtained which allows for nonequilibrium physicochemical processes and heat radiation of the gas at high temperatures. Author

N86-25535# Joint Publications Research Service, Arlington, Va.
CIRCULATION FLOW AT FORWARD SURFACE OF A SPHERE IN A SUPERSONIC WAKE-TYPE STREAM Abstract Only c34
Yu. P. Golovachev and N. V. Leontyeva *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 87-88 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhanika Zhidkosti i Gaza (USSR), no. 3, May-Jun. 1985 p 143-148 Original language document was announced in IAA as A85-44787 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

A study is made of an axisymmetrical steady flow around a spherical surface by a nonuniform supersonic wake-type stream with a formed head shock wave ahead of the body and a closed area of return circulation flow. The stream in the wake is modeled by a parallel axisymmetrical stream with constant pressure and axial velocity minimum and temperature maximum. It is shown that with fixed nonuniformity of the incident stream an increase in Reynolds number and cooling of the body surface lead to formation of a secondary eddy in the vicinity of the intersection of the contour of the body with the axis of symmetry. Specifics of the change in resistance parameters and heat exchange over the forward surface of cooled and insulated spheres are studied. The possibility is discussed of numerical modeling of the flow based on the equations of Euler. Author

N86-25536# Joint Publications Research Service, Arlington, Va.
SPECIFICS OF FLOW NEAR STAGNATION POINT WITH SUPERSONIC FLOW AROUND EXPONENTIALLY SHAPED BODIES Abstract Only c02
V. N. Karlovskiy and V. A. Levin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 88 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhanika Zhidoti i Gaza (USSR), no. 3, May-Jun. 1985 p. 138-142 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

A study is made of flow around bodies with shapes described by exponential equations with shock waves for the case of infinite curvature at the tip and finite curvature but infinite second derivative of curvature with respect to the longitudinal coordinate. The shape of the shock wave at the bow is determined by the profile of the entire subsonic portion of the body. The results produced thus can be considered possible cases of the formation of shock waves. Author

N86-25537# Joint Publications Research Service, Arlington, Va.
STABILITY OF SUBSONIC BOUNDARY LAYER UPON HEATING OF A SURFACE OF A FLAT PLATE NEAR THE LEADING EDGE Abstract Only c02
A. V. Kazakov, M. N. Kogan, and V. A. Kuparev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 89 Transl. into ENGLISH from Izvesitya Akademii Nauk SSSR: Mekhanika Zhidkosti i Gaza (Moscow, USSR), no. 3, May - Jun. 1985 p 68-72 Original language document was announced in IAA as A85-44783 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

The possibility of increasing flow stability in the boundary layer by heating the surface of a body near its leading edge, and thus raising the temperature of the gas in the boundary layer, is investigated analytically. It is shown that an increase in the surface temperature near the leading edge of a plate results in increased flow stability with respect to two-dimensional perturbations, with a loss of stability occuring at higher critical Reynolds numbers. The laminar-turbulent transition point shifts further downstream. Author

N86-25538# Joint Publications Research Service, Arlington, Va.
INCREASED STABILITY OF SUBSONIC BOUNDARY LAYER DURING HEATING OF SURFACE NEAR LEADING EDGE OF BODY IMMERSED IN STREAM Abstract Only c02
A. V. Kazakov, M. N. Kogan, and V. A. Kuparev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 91 Transl. into ENGLISH from Doklady Akademii Nauk SSSR (Moscow, USSR), v. 283, no. 2, Jul. 1985 p 333-335 Original language document was announced in IAA as A85-46029 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

Subsonic flow past a flate plate is analyzed for large values of the characteristic Reynolds number. The unperturbed flow near the plate is described by ordinary Prandtl equations for a stead-state boundary layer of a compressible heat-conducting gas; the equations are solved numerically using the finite difference method. It is shown that even when temperature distribution along the body surface is far from optimum, a forced increase in surface temperature near the leading edge of the plate leads to a noticeable decrease in the spatial growth coefficient of the Tollmien-Schlichting waves and to a downstream shift of the transition point. Author

N86-25539# Joint Publications Research Service, Arlington, Va.
CHINA REPORT: SCIENCE AND TECHNOLOGY
17 Jan. 1986 105 p refs Transl. into ENGLISH from various Chinese articles
(JPRS-CST-86-001) Avail: NTIS HC A06/MF A01

The topics from foreign newspapers, periodicals and books, and news agency transmissions and broadcasts included are: research policies; patents and proprietary technology imports; research organizations; nuclear fusion research; robotics; laser applications; electromagnetic pulses; and numerical control. For individual titles, see N86-25540 through N86-25546.

N86-25540# Joint Publications Research Service, Arlington, Va.
NATION'S LARGEST CONTROLLED FUSION RESEARCH FACILITY
In its China Report: Science and Technology (JPRS-CST-86-001) 17 Jan. 1986 p 49 Transl. into ENGLISH from Zhejiang Ribao (Hangzhou, China), 21 Nov. 1985 p 1 (For primary document see N86-25539 16-31)
Avail: NTIS HC A06/MF A01

The China HK-1 was certified as a controlled fusion experimental facility. The 5 Year Plan for nuclear fusion research is described. The China HL-1 facility will be handling experimentation using the ocean as an energy reservoir. B.G.

N86-25541# Joint Publications Research Service, Arlington, Va.
DEVELOPMENT OF INDUSTRIAL ROBOTS FOR THE AVIATION INDUSTRY
Chunfen Zhang *In its* China Report: Science and Technology (JPRS-CST-86-001) 17 Jan. 1986 p 60-63 Transl. into ENGLISH from Hangkong Zhizao Gongcheng (Beijing, China), no. 5, 1 May 1985 p 2-4 (For primary document see N86-25539 16-31)
Avail: NTIS HC A06/MF A01

The current status of robotic research in China is described, particularly the impact on the aviation industry. Suggestions are listed which would improve development and support consumer products. B.G.

N86-25542# Joint Publications Research Service, Arlington, Va.
LASER EXERCISE REMOTE CONTROL SYSTEM DEVELOPED
Anding Li *In its* China Report: Science and Technology (JPRS-CST-86-001) 17 Jan. 1986 p 71 Transl. into ENGLISH from Xinhua (Beijing, China), 27 Nov. 1985 (For primary document see N86-25539 16-31)
Avail: NTIS HC A06/MF A01

After 3 years, a YAG-dye-raman wide tunable laser system was developed which passed its technical appraisal tests. Applications are in the fields of laser spectrum, nonlinear optics, materials science, separation of isotopes, pollution monitoring, biology,

genetic engineering, and defense industry. Appraisal by experts is examined. B.G.

N86-25543# Joint Publications Research Service, Arlington, Va.
ELECTRICAL EXCITING TECHNIQUES FOR SIMULATING SYSTEM-GENERATED EMP
Guixin Peng *In its* China report: Science and Technology (JPRS-CST-86-001) 17 Jan. 1986 p 72-79 Transl. into ENGLISH from Hedianzianzixue Yu Tance Jishu (Beijing, China), v. 5, no. 5, Sep. 1985 p 280-284 (For primary document see N86-25539 16-31)
Avail: NTIS HC A06/MF A01

Fundamental knowledge of simulating system generated electromagnetic pulses (SGEMP) and simulating techniques are discussed in terms of basic electromagnetic response parameters. The simulating method is based on the Maxwell equation and its basic symmetry relationships. Electrical exciting techniques assume that the source term J is expressed as incident fields or current carrying conductors. Various electrical exciting methods are compared with respect to the source terms, relevant equations, and boundary conditions of each technique. B.G.

N86-25544# Joint Publications Research Service, Arlington, Va.
MICROCOMPUTER-BASED MULTIFUNCTION, MINIMULTI-CHANNEL ANALYZER c60
Jingjin Wang, Ying Chen, Yixiang Wei, Putang Zheng, Hongrei Zhang, Weitong Ji, and Xuehua Qiu *In its* China Report: Science and Technology (JPRS-CST-86-001) 17 Jan. 1986 p 80-84 ref Transl. into ENGLISH from Hedianzixue yu Tance Jishu (Beijing, China), v. 5, no. 5, Sep. 1985 p 297-299 (For primary document see N86-25539 16-31)
Avail: NTIS HC A06/MF A01

The multichannel analyzers now produced in China are basically made up of specialized hardware, their data processing functions are inadequate, and most data processing work is done by other computers. With the development of large scale integrated circuits in recent years, microcomputer functions have constantly increased and their performance/cost ratio has favored their use in nuclear data acquisition and processing systems. To satisfy the daily increasing need in China for a new multichannel analyzer, a small computer based multifunction, multichannel analyzer was developed. The design, technology, systems, and economic reliability are described. Author

N86-25545# Joint Publications Research Service, Arlington, Va.
THE STRUCTURE OF ZSM-5 MOLECULAR SIEVES AT HIGH TEMPERATURE Abstract Only c23
Zhenyi Liu, Wanjing Zhang, Bingxiong Lin, Wei Zhu et al *In* China Report: Science and Technology (JPRS-CST-86-001) 17 Jan. 1986 p 86 Transl. into ENGLISH from Ranliao Huaxue Xuebao (Taiyuan, China), v. 13, no. 2, Jun. 1985 p 106-113 (For primary document see N86-25539 16-31)
Avail: NTIS HC A06/MF A01

The crystal structure polycrystalline sample of ZSM-5 zeolite treated with high temperature steam was determined by X-ray diffraction at 500 C. The symmetry of the crystal changed from the space group C sup 5 (sub 2h)-P2 (sub 1/n) at room temperature to C sup 9 (sub 2v)-P2 (sub 1/n) at 500 C and the unit cell parameters were a = 20.09(3) A, b = 19.97(3) A, and C = 13.36(3) A. It is interesting that when the sample was cooled to room temperature again, it returned to C sub h-P2 (sub 1/n). At 500 C the three structural parameters related to shape selectivity (size and shape of both channel opening and bend angle of the Z-form channel) are similar to those at room temperature. Therefore, when molecules of different shapes enter the ZSM-5 channels, the steric hindrance or potential barrier does not change with temperature. It is concluded that the decrease in shape selectivity of ZSM-5 is due to an increase of active molecules in isohydrocarbons and not to the perceptible increase in the size of both channels and openings at elevated temperatures. Author

N86-25546# Joint Publications Research Service, Arlington, Va.
SPECTROSCOPIC OBSERVATIONS OF THE LINE STARK BROADENING IN THE ULTRAVIOLET VACUUM IN LASER-PRODUCED PLASMAS Abstract Only c75
Yongchang Wang, E. Jannitti, and G. Tondello *In its* China Report: Science and Technology (JPRS-CST-86-001) 17 Jan. 1986 p 99 Transl. into ENGLISH from Wuli Xuebao (Beijing, China), v. 34, no. 8, Aug. 1985 p 1049-1055 (For primary document see N86-25539 16-31)
Avail: NTIS HC A06/MF A01

The emission from dense plasmas produced by a Q-switched ruby laser pulse focusing on plane targets of the elements Be, C, and N were observed in an ultraviolet vacuum at various distances from the target surface. For recording the emission spectra an intensified photodiode array and an optical multichannel analyzer were implemented. Very broad lines of the type delta n = 1 of the H-like, He-like, and Li-like ions arising from the relatively high principal quantum number n appear prominent in the spectra. According to the ion quaistatic approximation theory, the electron densities of the plasmas as the function of the distances from the target were derived. Author

N86-25547# Joint Publications Research Service, Arlington, Va.
CHINA REPORT: SCIENCE AND TECHNOLOGY
31 Mar. 1986 129 p refs Transl. into ENGLISH from various Chinese articles
(JPRS-CST-86-011) Avail: NTIS HC A07/MF A01

The journal presents articles from many Chinese publications. Subject areas reported on are: physical sciences, applied sciences, environmental quality, aerodynamics, lasers, and solar energy. Of particular interest are the titles: Progress in ion-beam fusion research, Visibility of transverse cracks for radiographic inspection of welds,—Dry vacuum distillation, and Acid rain, other factors studied in destruction of pine forests. For individual titles, see N86-25548 through N86-25555.

N86-25548# Joint Publications Research Service, Arlington, Va.
PROGRESS IN ION-BEAM FUSION RESEARCH REVIEWED
Naiyan Wang *In its* China Report: Science and Technology (JPRS-CST-86-011) 31 Mar. 1986 p 56-65 refs Transl. into ENGLISH from He Kexue Yu Gongcheng (Beijing, China), v. 5, no. 3, Sep. 1985 p 269-276 (For primary document see N86-25547 16-31)
Avail: NTIS HC A07/MF A01

Progress in particle beam fusion research and key problems still awaiting solutions are outlined. A light ion beam is a potentially ideal driver for inertial confinement fusion because the pulsed power source for producing light ions is cheap and highly efficient. Research on diodes capable of efficiently producing a high brightness ion beam is described. The stopping power for light ion beams was calculated, taking account of both electrons confined in the target and free electrons. Experimental results show that when the current density of the beam is relatively high, the stopping power is twice that for a cold target. Implosion research is under way and cylinder implosion experiments were performed. Author

N86-25549# Joint Publications Research Service, Arlington, Va.
VISIBILITY OF TRANSVERSE CRACKS FOR RADIOGRAPHIC INSPECTION OF WELDS IN SPHERICAL VESSELS c39
Jicheng Xue and Yadeng Xu *In its* China Report: Science and Technology (JPRS-CST-86-011) 31 Mar. 1986 p 66-72 Transl. into ENGLISH from Wusunjiance (Shanghai, China), v. 6, no. 5, Dec. 1984 p 39-41 (For primary document see N86-25547 16-31)
Avail: NTIS HC A07/MF A01

Several factors affecting radiographic inspection of transverse cracks in welds in spherical vessels are discussed and some conclusions concerning them are drawn. Because of restraining conditions and residual stress from welding, welding seams in spherical vessels can have a rather serious tendency to crack if technical procedures are not strictly adhered to during assembly and installation. The cracks cause a loss of stability and can lead to leakage in spherical vessels, causing accidents. The results of more than 10 inspections of spherical vessels that were opened indicate that transverse cracks are more numerous in spherical vessel welding seams and that they assume a pattern of radiation

toward the center. There are many methods for nondestructive testing of spherical vessel welding seams to prevent accidents, and each has its own characteristics. Factors that affect the use of radiographic methods to make cracks visible are discussed.
E.R.

N86-25550# Joint Publications Research Service, Arlington, Va.
DRY VACUUM DISTILLATION DISCUSSED c45
Yunfu Mei and Naibo Gou *In its* China Report: Science and Technology (JPRS-CST-86-011) 31 Mar. 1986 p 78-84 refs Transl. into ENGLISH from Huaxue Shijie (Shanghai, China), v. 25, no. 9, 20 Sep. 1984 p 334-336 (For primary document see N86-25547 16-31)
Avail: NTIS HC A07/MF A01

Dry vacuum distillation, which is operated at higher vacuum and without steam injection, has been developed both in China and abroad. It can be used to improve the yields of gasoline and diesel oil as well as to increase the production of petrochemical feedstocks. Replacing wet vacuum distillation with dry vacuum distillation not only improve yield but also save energy and provide good operational flexibility. It is one of the good measures for realizing the four modernizations in oil refining and the chemical industry.
E.R.

N86-25551# Joint Publications Research Service, Arlington, Va.
ACID RAIN, OTHER FACTORS STUDIED IN DESTRUCTION OF PINE FORESTS c02
Shuwen Yu, Ziwen Yu, Houtian Liu, Jianmin Shu, Guangjing Ma, and Xiangyan Zhu *In its* China Report: Science and Technology (JPRS-CST-86-011) 31 Mar. 1986 p 92-98 refs Transl. into ENGLISH from Huanjing Kexue (Beijing, China), v. 6, no. 5, 30 Oct. 1985 p 63-66 (For primary document see N86-25547 16-31)
Avail: NTIS HC A07/MF A01

There are frequent reports of mass die-off of trees all the country. In Sichuan alone, there are three serious cases. In order to investigate the causes of death, the concerned state S&T Commission instructed the China Forestry Society to assemble a provisional investigation team. Together with experts from other institutions, the team arrived at the locations in Sichuan for a two week investigation. Studied were the causes for the deforestation and the economic impact of the tree deaths. Problems are stated and some brief solutions are advanced but mainly the need for further study is suggested.
E.R.

N86-25552# Joint Publications Research Service, Arlington, Va.
NUMERICAL PREDICTION OF SUPERSONIC BOUNDARY-LAYER TRANSITION Abstract Only c02
Guanghua Zhang and Hui Yang *In its* China Report: Science and Technology (JPRS-CST-86-011) 31 Mar. 1986 p 99 Transl. into ENGLISH from Kongqidongliuxe Xuebao (Mianyang, China), no. 4, 1985 p 9-18 (For primary document see N86-25547 16-31)
Avail: NTIS HC A07/MF A01

The turbulence model developed by Wilcox and Traci for predicting boundary layer transition was improved in some aspects. A series of numerical experiments were performed on the improved model to predict the supersonic boundary layer transition on a sharp cone with zero angle of attack. The computational results are compared with the wind tunnel test data reported by van Driest and Boison. Satisfactory agreement between numerical and wind tunnel experiments is obtained in many major aspects.
Author

N86-25553# Joint Publications Research Service, Arlington, Va.
MOVEMENT OF HYDROMETEOR PARTICLE CLOUD IN BOW SHOCK LAYER Abstract Only
Guoying Zhao *In its* China Report: Science and Technology (JPRS-CST-86-011) 31 Mar. 1986 p 100 (For primary document see N86-25547 16-31)
Avail: NTIS HC A07/MF A01

During reentry, high speed vehicles may encounter condensed phase H2O in the form of ice particles or liquid droplets, which form so called particle clouds. These particles must traverse the shocked air layer enveloping the reentering vehicle prior to impacting the surface. The interaction between the gas and the particles in the shock layer is usually investigated by calculating the trajectory of every particle in the gas flow field with consideration of the presence of other particles (this method is called one-way coupling). A gas-(solid and liquid) particle two fluid flow model is presented, including the interaction (i.e., the mass, momentum and heat transfer) between the two phases (that is, a two way coupling is taken into account), and the dissociation and ionization of the air and the dissociation of the steam (from the particle cloud). The model is solved by using the line method. The flow field of gas and the particle cloud is obtained, and the applicable range of one way coupling is studied. Finally some interesting discussions are presented.
Author

N86-25554# Joint Publications Research Service, Arlington, Va.
KERNEL FUNCTION METHOD FOR UNSTEADY TRANSONIC FLOW PAST LOW-FREQUENCY OSCILLATING BODIES OF REVOLUTION Abstract Only c02
Jianyu Cheng and Lixian Zhuang *In its* China Report: Science and Technology (JPRS-CST-86-011) 31 Mar. 1986 p 101 Transl. into ENGLISH from Kongqidonglixue Xuebao (Mianyang, China), no. 4, 1985 p 45-54 (For primary document see N86-25547 16-31)
Avail: NTIS HC A07/MF A01

An approximate method is developed to calculate the unsteady surface pressure distributions and stability derivatives for elongated axisymmetric bodies of revolution undergoing harmonic pitching oscillations in transonic flow. The analysis is based on the time linearized transonic small disturbance equation and the concept of local linearization. An integral equation is obtained and solved numerically with the panel method. Some results of the present method are compared with those of other theoretical methods and experiments.
Author

N86-25555# Joint Publications Research Service, Arlington, Va.
NORMAL FORCE CHARACTERISTICS OF SHARP NOSED BODIES OF REVOLUTION AT HIGH ANGLES OF ATTACK IN SUBSONIC AND TRANSONIC FLOW Abstract Only
Xing Tu and Wenkang Wu *In its* China Report: Science and Technology (JPRS-CST-86-011) 31 Mar. 1986 p 102 Transl. into ENGLISH from Kongqidonglixue Xuebao (Mianyang, China), no. 4, 1985 p 81-89 (For primary document see N86-25547 16-31)
Avail: NTIS HC A07/MF A01

The normal force characteristics of sharp nosed bodies of revolution were investigated experimentally at high angles of attack in a Mack number range form 0.35 to 1.20. The test results were analyzed. It was shown that both the Mach number and the Reynolds number strongly influence the normal force characteristics. The calculation methods based on crossflow theory had not taken into account the effects of viscosity and compressibility, so the actual phenomenon could not be represented. The present research also investigated the effect of rolling orientation on the normal force characteristics experimentally. It was shown that the vortex pattern on the leeside surface has a considerable effect on the normal force coefficient. The difference of the normal force coefficient for different rolling orientations is approximately the same as the magnitude of the Mack number effect. For sharp nosed bodies of revolution the vortex pattern on the leeside surface cannot be predicted precisely. For the same model, at the same angle of attack, the vortex pattern is different with different rolling orientations. Therefore, we can predict that the aerodynamic characteristics of sharp nosed bodies of revolution at high angles of attack should not be unique, and they can vary within a certain range.
Author

N86-25556# Joint Publications Research Service, Arlington, Va.
USSR REPORT: ENGINEERING AND EQUIPMENT
24 Jan. 1986 104 p Transl. into ENGLISH from various Russian articles
(JPRS-UEQ-86-001) Avail: NTIS HC A06/MF A01

Topics on engineering and equipment from foreign newspapers, periodicals and books, and news agency transmissions and broadcasts presented include: aeronautics and space; marine environments and shipbuilding; nuclear energy; non-nuclear energy;

construction; inductrial technology; turbine and engine design; navigation and guidance systems; high energy devices, optics, and photography; fluid mechanics; and mechanics of solids. For individual titles, see N86-25557 through N86-25598.

N86-25557# Joint Publications Research Service, Arlington, Va.
STABILITY OF INFINITELY WIDE TRIPLE-LAYER PANEL PROPELLED BY TRACKING FORCE Abstract Only
N. B. Grigoryan *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 1 Transl. into ENGLISH from Izvestiya Akademii Nauk Armyanskoy SSR: Mekhanika (Yerevan, USSR), v. 37, no. 6, Nov. - Dec. 1984 p 65-73 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The flight of an infinitely wide triple layer panel driven by a uniformaly distributed compressive tracking force at a constant acceleration is analyzed as flutter of a nonconservative system. For stability analysis of such a system, the equations of small transverse vibrations are derived from the balance of forces on an element of unit width and infinitesimal length. Three different boundary conditions are considered: both panel edges free; one panel edge free and the other edge constrained by by an infinitely stiff diaphragm; and each panel constrained. Stability analysis of such systems by the dynamic method of Bolotin involves determining the load dependence of the vibration frequency. The critical load under which the vibration amplitude begins to increase is determined, after the frequency equation was obtained from the characteristic equations. The algorithm was programmed for computer calculation and applied to the panels. B.G.

N86-25558# Joint Publications Research Service, Arlington, Va.
SUPERSONIC FLOW AROUND BLUNT PERFORATED SHIELDS Abstract Only c02
S. V. Guvernyuk, K. G. Savinov, and G. S. Ulyanov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 2 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Zhidkosti i Gaza (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 143-149 Original language document was announced in IAA as A85-28442 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Experimental results are presented on flow past thin porous metallic disks and square plates at high angles of attack (75 to 90 deg), Mach numbers of 2.0 to 3.0 and Reynolds number of 2 to 4 million in a supersonic wind tunnel. The features characterizing flow past such screens are found to be determined by intense self sustaining gas injection into the base region. The dependence of the aerodynamic characteristics on the porosity coefficient of the screen is studied for a freestream Mach number of 3. B.J.

N86-25559# Joint Publications Research Service, Arlington, Va.
AERODYNAMIC INDUCTANCE OF SUBSONIC WIND TUNNELS WITH AXISYMMETRIC TEST ZONE Abstract Only c02
O. Yu. Starikov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 3 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Zhidkosti i Gaza (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 150-154 Original language document was announced in IAA as A85-28443 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The axisymmetric boundary value problem concerning subsonic flow past a thin body of revolution within porous walls is solved for small velocity perturbations at the flow boundary in a subsonic wind tunnel. The boundary condition connects the tangential and normal (to the wall) components of the perturbed velocity, and has a general form for the whole boundary. The optimal wall porosity for which the distortion of the pressure coefficient on the model surface is minimal compared with unbounded flow is determined from the solution obtained. B.J.

N86-25560# Joint Publications Research Service, Arlington, Va.
FLOW AROUND DELTA WINGS WITH BROKEN-LINE LEADING EDGES Abstract Only c02
A. I. Shvets *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 3 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Zhidkosti i Gaza (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 171-175 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Two design concepts of delta wings for optimal performance at hypersonic velocities are compared on the basis of experimental data and analytic evaluation. Plain delta wings triangular in the plan view, with the dihedral angle ranging from 180 deg in a flat triangular wing to 0 deg in a completely folded one were considered. Tests were performed on such wings with 150 to 180 deg at angles of attack from -2 to +15 deg in a wind tunnel with the wind velocity varied over the Mach number 4 to 8. Tests were performed on five models of delta wing with broken line leading edges with a 70 deg sweepback angle of the nose and a 50 deg sweepback angle of the tail, all having the same 100 mm half span in the plan view but each having a different dihedral angle of 60, 100, 140, 180, and 220 deg respectively. Both the lift coefficient and the drag coefficient were measured in the wind tunnel at a wind velocity corresponding to the Mach number 3, for determining their dependence and the lift to drag ratio on the angle of attack. The aerodynamic characteristics of the wing models with the optimal dihedral angle were found to be better than those of flat wings with broken line leading edges. Author

N86-25561# Joint Publications Research Service, Arlington, Va.
APPLICATION OF AVERAGING METHOD TO PROBLEM OF CONTROL SYNTHESIS Abstract Only c09
A. P. Vyazovik *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 4 Transl. into ENGLISH from Mekhanika Tverdogo Tela (Moscow, USSR), no. 4, Jul. - Aug. 1984 p 6-13 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

A scheme for nonlinear synthesis of control of systems containing slow and fast variables is developed on the basis of the fundamental constructs of the averaging method. The proposed method is used to solve the problem of controlling the movement of an aerodynamic object. In the approach employed, it is not required that the slow movements of the initial and averaged system be close during transients, which simplifies the formalization of the separation of motions. the synthesized control is modeled by the computer for the launch of an aerodynamic object 22.5 km from the coordinate origin, with different angles between the velocity vector and the radius vector of the center of mass. The trajectories obtained behave such that the velocity vector first turns toward the coordinate origin, followed by the near rectilinear movement in the required direction. The integral curves are close to the plane defined by the initial velocity vectors and to the coordinate origin. Author

N86-25562# Joint Publications Research Service, Arlington, Va.
MOVEMENT OF FLEXIBLE WING AT SUPERSONIC VELOCITY UNDER INFLUENCE OF RANDOM GUST Abstract Only c02
B. A. Yershov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 4-5 Transl. into ENGLISH from Vestnik Leningradskogo Universiteta: Matematika, Mekhanika, Astronomiya (Leningrad, USSR), no. 1, Jan. - Mar. 1985 p 59-63 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The motion of an elastic wing of infinite span in an ideal compressible fluid under the action of a turbulent stream is modeled by a random vertical gust. The unperturbed motion is the movement of a rigid wing at constant horizontal velocity greater than the speed of sound in the undisturbed stream. The perturbed motion is the deformation of the wing. The problem is reduced to an integro-differential equation in partial derivatives. The problem is one of connected aeroelasticity, such that the deformation of the elastic wing excited by the air stream changes the air stream itself. The present problem is determined by the wave equation for the excited velocity potential and the equation of oscillation of the infinite wing plate, related by the boundary condition on the wing. Author

N86-25563# Joint Publications Research Service, Arlington, Va.
OSCILLATIONS IN JET STRIKING BARRIER Abstract Only c08
V. Ye. Kuzmina *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 5 Transl. into ENGLISH from Vestnik Leningradskogo Universiteta: Matematika, Mekhanika, Astronomiya (Leningrad, USSR), no. 1, Jan. - Mar. 1985 p 63-69 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

A numerical study is presented of self-excited oscillations in a supersonic axisymmetrical jet striking an infinite flat barrier perpendicular to the axis of the jet. Information obtained in a numerical experiment concerning the flow in the area of interaction of the jet with the barrier is used to construct a physical model of the phenomenon. The jet striking this barrier is a self excited oscillating system in which is created by the constant source of energy, the gas mass exciting from the nozzle. The major supplement to the previously suggested physical model is the introduction of additional feedback through the peripheral gas flow. Author

N86-25564# Joint Publications Research Service, Arlington, Va.
LIMITS OF HEAT TRANSFER INTENSIFICATION IN COMPACT HEAT EXCHANGERS Abstract Only c05
V. I. Subbotin, V. F. Gordeyev, V. V. Kharitonov, and A. A. Plakseyev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 25 Transl. into ENGLISH from Doklady Akademii Nauk SSSR (Moscow, USSR), v. 279, no. 4, Dec. 1984 p 888-891 Original language document was announced in IAA as A85-20092 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Heat transfer in a heat exchanger of the simplest design, a plane porous layer between two solid plates, is analyzed on the basis of the two dimension/two temperature models. The two dimesional temperature field in the porous layer heated by a thermal flux from the sheath plates and cooled by a fluid filtering through it, is calculated as the solution to the corresponding system of Fourier equations of steady heat conduction and convection for the appropriate boundary conditions, assuming a negligible thermal conductivity of the fluid coolant in the direction of flow. The solution reveals that volume rather than surface heat transfer is the principal intensifiable component. Accordingly, four possible methods of heat transfer intensification are evaluated and their limits are compared: increasing the dispersion of the porous layer; use of liquid metals as coolants; use of low boiling or easily vaporized liquids such as water and organic fluids as coolants; and artificial turbulization of the coolant flow. The porous layer can be designed with microchannels, holes, or slots, with sponge or brush structure, and can be made of sintered metal fibers or powder. Author

N86-25565# Joint Publications Research Service, Arlington, Va.
SEMICONDUCTOR TEMPERATURE AND STRAIN GAUGES Abstract Only c02
M. T. Gorbachuk, V. V. Mitin, Yu. M. Shvarts, and Yu. A. Tkhorik *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 40 Transl. into ENGLISH from Pribory i Sistemy Upravleniya (Moscow, USSR), no. 9, Sep. 1984 p 21-22 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

A method is proposed which permits the same sensor to be used to measure the temperature and deforming stress (load), and which reduces the errors caused by the simultaneous influence of temperature and strain on the working element of the sensor. The findings are obtained on p-type germanium subjected to uniaxial loading, which disturbs the initial symmetry of the p-Ge. Formulas are derived which make it possible to determine the temperature and strain from the known resistance of the deformed specimen parallel and perpendicular to the axis of deformation. The method permits the strain sensing element to be made of lightly doped material; the temperature range is determined by the size of the interval in which the electrophysical properties of the material employed remain uniform. The results of experimentation using a gauge incorporating a sensing element made of a single crystal of p-type germanium with specific resistance of 41 Ohm per centimeter at room temperature are presented. Author

N86-25566# Joint Publications Research Service, Arlington, Va.
MODERN ULTRASONIC FLOWMETERS Abstract Only c34
V. M. Gurevich and S. G. Truman *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 41-42 Transl. into ENGLISH from Sovremennyye Ultrazvukovyye Rashodomery (Moscow, USSR), 1984 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The current status of ultrasonic flowmeters were reviewed on the basis of materials published in the Soviet Union and elsewhere. The following advantages of ultrasonic flowmeters over earlier instruments are cited. A comparative analysis is made of the design methods employed in ultrasonic flowmeters. The evolution of ultrasonic flowmetering is traced from the first generation and trends in their development are analyzed. B.G.

N86-25567# Joint Publications Research Service, Arlington, Va.
PIEZORESONANT PRESSURE SENSORS Abstract Only c35
L. V. Maleyko, V. V. Malov, A. P. Rudenkov, I. V. Yakovlev, T. B. Ibragimov, V. A. Maglysh, O. F. Migukina, and Pitkevich *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 42 Transl. into ENGLISH from Pribory i Sistemy Upravleniya (Moscow, USSR), no. 9, Sep. 1984 p 19-21 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Piezoresonant pressure sensors based on existing commercially produced high frequency thermostable piezoelements are described. The possibility of developing a design series of piezoresonant pressure sensors operating in the 0.1 to 600 kPa range for measuring atmospheric pressure in enclosed spaces is examined. The use of a piezoresonator in a self sustained oscillator circuit makes it possible to obtain a signal with frequency proportional to the amount of pressure applies. The maximum error obtained meteorlogical testing of a number of pressure sensor specimens at the Scientific Research Institute for Metrology imeni D. I. Mendeleyev (Leningrad) are presented. The measurement range of piezoresonant sensors can be changed by changing the effective area of the membrane and the distance from the top of the piezoresonator to the edge of the electrode and from the bottom of the piezoresonator down to the edge of the electrode. The sensitivity of the sensor can be increased by making the ratio lambda/beta smaller. The use of a type-A piezoresonator is preferred for building high precision position sensors. Author

N86-25568# Joint Publications Research Service, Arlington, Va.
SEALED REED RELAY LIMIT SWITCHES Abstract Only c35
I. P. Ivanov, G. P. Svintsov, M. A. Yefimova, A. V. Lebedev, and Yu. P. Samsonov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 43 Transl. into ENGLISH from Pribory i Sistemy Upravleniya (Moscow, USSR), no. 9, Sep. 1984 p 17-19 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Sealed reed relay limit switches are described which overcome the inherent deficiencies traditionally present in these devices: high material, labor consumption, and difficult operation. Series VSG limit switches developed at the All-Union Scientific Research and Technological Planning Institute for Relay Engineering (Cheboksary) for use in buildings are described. The VSG1 has a single switching contact, the VSG2 a single normally open contact, and the VSG3 a single normally closed contact. The VSG1 employs type MKS-27103 sealed reed relays, while the VSG2 and VSG3 employ KEM-1 reed relays. The magnet system, which consists of magnets and a plate, and the sealed reed relay are contained in a nonmagnetic casing with a slit in it. The mathematical expression defining the geometric dimensions of the magnet system is given. The basic parameteres of all three types of switches are tabulated. The VSG series switches can be used to replace VBK and BVK switches, thus saving electricity, labor, and materials, including silver. Author

N86-25569# Joint Publications Research Service, Arlington, Va.
CONTACTLESS POSITION SENSOR Abstract Only c35
I. I. Popov, G. S. Pyatlina, and Ye. A. Shulyakovskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 43 Transl. into ENGLISH from Pribory i Sistemy Upravleniya (Moscow, USSR), no. 9, Sep. 1984 p 16-17 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

A new contactless position sensor for switching electrical control and signalling circuits based on the Hall effect is described. The control element (a permanent magnet) is fastened securely to the moving controlled member. When the controlled member reaches some assigned position, the magnetic field of the control element acts upon the sensing element (a Hall element), which outputs a signal whose voltage depends upon the direction of the vectors of the supply current and the magnetic induction. The output signal is fed to a switching element which converts the analog output signal to discrete measurement values. The schematic diagram, timing diagram, and technical specifications of the sensor are present. Author

N86-25570# Joint Publications Research Service, Arlington, Va.
METHOD OF REDUCING VIBRATIONS IN MACHINES WITH HIGH-SPEED ROTOR ON BALL BEARINGS Abstract Only c33
V. B. Balmont *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 45 Transl. into ENGLISH from Izvestiya Vysshihk Uchebnykh Zavedeniy: Mashinostroyeniye (Moscow, USSR), no. 6, Jun. 1984 p 28-33 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Vibrations in a machine with a high speed rotor mounted on geometrically imperfect ball bearings are analyzed. Three series of frequencies were identified in the perturbation spectrum: vibrations caused by defects in the inner race; vibrations caused by defects in balls and their interaction with race defect; and vibrations caused by dimensional variance of balls. From the standpoint of a deterministic spectrum of vibration frequencies, the design of the ball bearings is analyzed for reduction of vibration amplitudes. The constraints were applied to two pairs of radial bearings: standard 4-I2010 and high precision 4-I2010T. Theoretical design calculations and experimental data indicate that, with a definite ratio of ball diameter to diameter of the center circle, the perturbation frequencies can be designed not to coincide with the natural frequencies and the amplitude of vibrations will be greatly reduced. B.G.

N86-25571# Joint Publications Research Service, Arlington, Va.
CHARACTERISTICS OF MANIPULATOR FOR INDUSTRIAL ROBOT WITH THREE ROTATIONAL PAIRS HAVING PARALLEL AXES Abstract Only c33
M. I. Poteyev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 46 Transl. into ENGLISH from Izvestiya Vysshikh Uchebnykh Zavedenii: Mashinostroyeniye (Moscow, USSR), no. 6, Jun. 1984 p 54-57 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The dynamics of a manipulator with three rotatinal kinematic pairs having parallel axes are analyzed, for application in an industrial robot. The system of Lagrange equations of the second kind, describing the motion of such a mechanism in terms of kinetic energy in generalized coordinates, is reduced to equations of motion in terms of Newton's laws. These are useful not only for either determining the moments of force couples which will produce a prescribed motion or, conversely determining the motion which given force couples will produce but also for solving optimization problems under constraints in both cases and for estimating dynamic errors. As a specific example, a manipulator with all three axes of vertical rotation is considered. The performance of this manipulator, namely the parameters of its motion as functions of time, is compared with that of a manipulator having one rotational and two translational kinematic pairs. Computer aided simulation of their motion on the basis of ideal models, with all three links represented by identical homogeneous bars, has yielded velocity time diagrams which indicate that the manipulator with three rotational pairs is 4.5 times faster. Author

N86-25572# Joint Publications Research Service, Arlington, Va.
CONTROLLING MOVEMENT OF MANIPULATOR WITH ALLOWANCE FOR ELASTIC OSCILLATIONS OF ARM Abstract Only c37
N. N. Bolotnik and A. A. Gukasyan *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 46-47 Transl. into ENGLISH from Mekhanika Tverdogo Tela (Moscow, USSR), no. 4, Jul. - Aug. 1984 p 38-46 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

A mechanical model of a manipulator with three degrees of mobility is examined. The manipulator consists of a stationary base, a pedestal, a vertically oriented shaft, a guide, and an arm. The base, pedestal, shaft, and guide are assumed to be absolutely solid bodies; the arm is a uniform elastic round rod subjected to slight flexing. The shaft of the manipulator moves vertically and rotates about the vertical axis; the arm moves back and forth along the guide. The system is controlled by the virtue of the force with respect to the axis of revolution of the shaft, the vertical force applied to the shaft, and the force applied to the arm. An expression is derived for the kinetic energy of the mechanical system. The problem of defining the control of the system of Lagrange equations describing the movement of the system is analyzed and found to have more than one solution. An algorithm is proposed for calculating the parameters of the control mode which provides the required positioning accuracy. The problem of controlling the rotation of the arm without extension or retraction is analyzed as an example. Author

N86-25573# Joint Publications Research Service, Arlington, Va.
CONVERTER OF ROTATING-TRANSFORMER SIGNALS TO CODE OF SUCCESSIVE-APPROXIMATION ANGLE Abstract Only
V. G. Domrachev and V. A. Podolyan *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 48 Transl. into ENGLISH from Izmeritelnaya Teknika (Moscow, USSR), no. 8, Aug. 1984 p 18-20 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

A cyclic converter of signals from a rotating sine-cosine resolver transformer to a binary code of the angle through successive approximation was designed with large to small scale circuit integration. Its two channels yield informative outputs of 12-bit word length. The conversion process is conventional, with mismatch signals being formed in accordance with the algorithms and then reduced to zero digit by digit by the method of successive approximations. Variable input signals are converted into constant ones with the aid of a sampler-storage device. Other converter components are a read-only memory with synchronous pulse energizing and synchronous code recording, a digital to analog converter, four sign-inverting analog switches, a comparator with summation of products at the input and a trigger transmitting the somparator output signal to a successive approximations register, as well as analog switches for channel commutation and function commutation, operational amplifier, and resistor banks. Functions are recorded in the memory without deficiency, owing to addition of a modified memory which records codes with excess. Author

N86-25574# Joint Publications Research Service, Arlington, Va.
AMPLITUDINAL ANGLE-TO-CODE CONVERTER WITH ROTATING SINE-COSINE TRANSFORMER Abstract Only
B. A. Kudryashov, Yu. S. Smirnov, and A. B. Shishkov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 49 Transl. into ENGLISH from Izmeritelnaya Tekhnika (Moscow, USSR), no. 8, Aug. 1984 p 20-21 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

An angle-amplitude-code converter with rotating sine-cosine-resolver transformer was developed which operates at high speed

without large dynamic error, when only the digital equivalent of the angle is required without scaling or sine and cosine codes. The output signal of the rotating resolver-transformer passes through an angle to tangent and tangent to code converter which feeds the angle code to a read-only memory. The converter consists of a code to sine/cosine converter, one octant detector, an analog commutator, and an analog to digital converter. The rotating resolver-transformer is energized from a reference voltage generator. The output signal of the octant detector is fed to the commutator and also to an exclusive OR gate which receives the angle code from the memory and to a code storage register which receives the output signal from the exclusive OR gate. That register forms and delivers the angle code. The instrument error is smaller here because code to voltage conversion was eliminated, and there is no methodological error here so that the accuracy of this device is much higher than that of conventional angle to code converters. Author

N86-25575# Joint Publications Research Service, Arlington, Va.
SELECTION OF TEST ACCELERATION FACTOR FOR BEARING ASSEMBLIES OF ELECTRICAL MACHINES Abstract Only **c37**

O. D. Goldberg, A. G. Gorbunov, and S. V. Muravyev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 51 Transl. into ENGLISH from Elektroteknika (Moscow, USSR), no. 10, Oct. 1984 p 34-36 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The fundamental relation for the service life of ball bearings serves as the basis for determining the mode of service life test acceleration. The test time can be shortened by the factor K sub a = (overload/nominal load) cubed, with a correction factor which accounts for the dependence of service life under a cyclic load on the mode of lubrication and thus on temperature rise. These relations were used for acceleration service life and failure tests of high capacity high precision ball bearing with three different plastic lubricants in wound induction motors, high temperature Class H insulation of the motor coils ensuring that 90 to 95% of all failures under overload were bearing related. Data on 308 to 310 bearings in ten 55 kW motors running at 6000 rpm revealed, upon regression analysis, that degradation of the lubricant to zero electrical resistance at the critical temperature increases the vibration acceleration level from a steady mean initial 70 dB to 100 to 110 dB. Bearings should not be overloaded beyond 0.9 T sub c, T sub c being the critical temperature for a given lubricant. B.G.

N86-25576# Joint Publications Research Service, Arlington, Va.
HARDENING TREATMENT OF MACHINE PARTS WITH CO2 POWER LASERS Abstract Only **c36**

A. S. Borodachev, M. B. Gutman, G. A. Kuznetsov, L. A. Medvedovskaya, and G. K. Rubin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 52 Transl. into ENGLISH from Elektrotekhnika (Moscow, USSR), no. 10, Oct. 1984 p 51-54 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Two technological laser facilities were built at the All-Union Scientific Research Institute of Electrothermal Equipment for hardening machine parts using 1.2 and 2.5 kW CO2 lasers. Both lasers are continuous wave devices with self sustained gas discharge between flat anode and tubular cathode. Each facility includes a Fabry-Perot resonator, a beam transporting and focusing mechanism, a laser power measuring instrument with a movable beam chopping mirror, and a helium/neon simulating laser with two mirrors for precision alignment of parts. These facilities are intended not only for hardening, but also for annealing, plating, and alloying. Under consideration is also use for welding and cutting. Materials hardenable with these facilities range from perlite iron to chromium steels. Experimentally hardened parts include tool bits, gear teeth, zinc extrusion plungers, bearing races, king pins, bolts, and even diesel cylinders. Hardening is done to ensure high wear resistance of the materials and long service life for the part. B.G.

N86-25577# Joint Publications Research Service, Arlington, Va.
NEW METHOD OF SYNTHESIZING NOMINAL TRAJECTORY FOR MANIPULATOR ROBOTS WITH REDUNDANT DEGREES OF MOBILITY Abstract Only **c37**

M. Vukobratovic and M. Kircanska *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 53 Transl. into ENGLISH from Mashinovedeniye (Moscow, USSR), no. 4, Jul. - Aug. 1984 p 21-25 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The reverse problem of control for a manipulator with redundant degrees of mobility, namely synthesis of its nominal trajectory to eliminate the attendant indeterminacy, is solved by a method which draws not only on the governing kinematic relations but also on the complete dynamic characteristics of such a mechanism. The dynamic characteristics can be evaluated by any method, from general theorems of mechanics as well as from corresponding Lagrange or Gibbs-Appel equations. Here the problem is formulated in generalized Lagrange coordinates for a manipulator with n degrees of mobility. Solution of the problem includes optimization of the vector of their first derivatives. The procedure and a numerical solution are demonstrated on synthesis of a continuous trajectory for a manipulator with four degrees of mobility. The results indicate the integration must be performed over time intervals sufficiently short to minimize the optimization error and sufficiently long to avoid numerical instability of matrix inversions. Author

N86-25578# Joint Publications Research Service, Arlington, Va.
INDUCED VIBRATIONS AND RESONANCE OF SHAFT UNDER NONSTEADY LOAD Abstract Only **c39**

A. I. Vesnitskiy, I. V. Miloserdova, and A. I. Potapov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 53-54 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 103-110 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Torsional vibrations of the rotating shaft in a slider-crank mechanism are analyzed. The corresponding equation of motion is solved for appropriate boundary conditions at both drive end and load end of the shaft. An analysis of the solution reveals anharmonic natural vibrations and resonance under a load with a frequency equal to the time derivative of their phase. The simplest special case is uniform shaft rotation. For an analysis of the mechanism with a range of parametric instability, with stringent constraints on the rate of change of the moment of inertia, the sought solution must be resolved into combination modes. Such a solution can be found exactly, and describes steady state interaction of induced and parametric vibrations, parametric amplification and attenuation of induced vibrations, and excitation of pulsations. B.G.

N86-25579# Joint Publications Research Service, Arlington, Va.
ENGINEERING DESIGN AND OPTIMIZATION OF RADIAL AEROSTATIC BEARINGS Abstract Only **c37**

V. S. Balasanyan and N. Sh. Zhapparov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 54 Transl. into ENGLISH from Mashinovedeniye (Moscow, USSR), no. 4, Jul. - Aug. 1984 p 84-91 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The engineering method developed earlier by V. S. Balasanya for design and optimization of horizontal radial aerostatic guide bearings with discrete feed and supercharge is refined by including the dimensions of pockets and the throttling of air twice, first through an orifice and then through an annular diaphragm in the clearance upon exit from a pocket. This is in addition to including the effect of circumferential leakage on the corrections to two discreteness factors in calculation of bearing stiffness and pressure flow distribution, as well as on the supercharge lines schematic. The bearing performance parameters are evaluated first, analytically and then numerically. Results reveal that inclusion of the double throttle improves the accuracy of calculations appreciably when the areas of orifice and diaphragm are comparable. The size of

the pocket diameter affects the optimum orifice diameter and the bearing stiffness, both increasing somewhat as the diameter is increased. In the real case of a large pocket, throttling occurs principally through the orifice, however, and comparison with experimental data reveals that accounting for the double throttle does not significantly improve the accuracy of performance calculations. Author

N86-25580# Joint Publications Research Service, Arlington, Va.
DYNAMIC DESIGN OF SLIDING BEARINGS Abstract Only **c37**

I. M. Khomenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 55 Transl. into ENGLISH from Vestnik Mashinostroyeniya (Moscow, USSR), no. 8, Aug. 1984 p 9-12 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The design and performance of a sliding bearing under dynamic conditions are analyzed, the object being to determine the maximum allowable shaft (rotor) unbalance and the minimum thickness of lubricant film for a given minimum radial clearance. The calculations are based on the theory of motion of unbalanced bodies, unbalance being defined as the distance from geometric center to center of mass and the shaft assumed to be in equilibrium when the centers of both bearings lie on a horizontal line. Conditions of shaft oscillation with unilateral shaft wear are considered, depending on whether the inertia load is respectively smaller or larger than the static load (rotor mass), but the worst case being the critical conditions where both are equal so that breakaway and impacts can occur. Author

N86-25581# Joint Publications Research Service, Arlington, Va.
MATCHING HEAD AND CAVITATION CHARACTERISTICS OF TWIN AXIAL (WORM-TYPE) PUMP IMPELLERS Abstract Only **c37**

I. V. Shcherbatenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 56 Transl. into ENGLISH from Vestnik Mashinostroyeniya (Moscow, USSR), no. 8, Aug. 1984 p 12-14 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The cavitation characteristics of centrifugal pumps are improved by placing a worm impeller in front of the main one, which also raises the second critical breakaway cavitation factor from 1500 to 2500 and 4000 to 5000. A further improvement of such centrifugal worm pumps is the addition of another worm impeller in front of the other one, either on a separate shaft rotating at a lower speed or on the same shaft with a larger radial clearance. The problem is to match the cavitation factor, now in the 15,000 to 20,000 range, with the specific speed and thus with the head. The vanes of this auxiliary impeller are set at an angle which will ensure cavitational breakaway simultaneously at both worms so as to maximize the working head in both worm impellers with the critical margin of cavitation head at its minimum. The analysis can thus be reduced to conventional theory. Calculations on this basis are made for a twin-worm impeller with uniform vane pitch in a viscous imcompressible fluid. The dependence of the blade setting angle on the pump capacity and the fringe losses is obtained for design purposes. Author

N86-25582# Joint Publications Research Service, Arlington, Va.
INTEGRAL METHOD OF CALCULATING LOADS ON BEARINGS IN GEAR-TYPE ROTARY PUMPS WITH LIMITED WORKING SPACE Abstract Only **c37**

E. I. Rudoy and A. G. Garkusha *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 56 Transl. into ENGLISH from Vestnik Mashinostroyeniya (Moscow, USSR), no. 8, Aug. 1984 p 15-17 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The performance of gear type rotary pumps, which operate under periodically varying flow rate and outlet pressure, depends largely on the loads on the gears and their bearings. These loads are determined by the corresponding varying dimensions of the high pressure zone and are calculated either exactly at only several critical points, a laborious procedure, or on the basis of only approximate empirical relations. Integral averaging of the varible quantities is proposed instead, so as to combine simplicity with infinitesimal discretization. The total load on a bearing is the sum of the hydraulic pressure by the fluid and the tooth contact pressure transmitted through the seals. The instantaneous horizontal and vertical components of hydraulic pressure are integrated with respect to the coordinate of the tooth contact point on the line of action over a full tooth pitch on the base circle, assuming a constant speed of rotation and thus a uniform motion of the contact point. For numerical data and illustration of the method, calculations were made for pumps developing a pressure head of 16 MPa. Author

N86-25583# Joint Publications Research Service, Arlington, Va.
EFFECT OF UNDERCOATING BY HEAT AND AIR BLAST TREATMENT ON TRIBOLOGICAL CHARACTERISTICS OF SOLID LUBRICANT IN STEEL FRICTION PAIRS Abstract Only **c37**

Z. S. Rubsova, L. N. Sentyurikhina, G. A. Protasov, and V. I. Lopukhin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 57 Transl. into ENGLISH from Vestnik Mashinostroyeniya (Moscow, USSR), no. 8, Aug. 1984 p 26-27 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The effectiveness of solid lubricants such as molybdenum disulfide coated on the mating surfaces of friction pairs can be further increased, in terms of wear reduction, by undercoating the surfaces with a layer of nickel-chromium steel or a high-chromium steel plus molybdenum composite. An experimental study of this technique was made on friction elements made of stainless steel. Solid lubricant coating was deposited after grinding and sand (corundum) blasting of the undercoated surfaces. Tests at temperatures of 20 to 150 C with rubbing velocities of 0.23 to 0.87 m/s under an initially 1290 to 1760 MPa contact pressure were performed on friction pairs with 100 to 110 micrometer thick undercoatings. These test were performed with the principal friction pair consisting of a rotating steel disk and a stationary steel ball. The results indicate that the maximum wear resistance of the mating surfaces is attained by undercoating either both surfaces or the one which will not be subsequently coated with solid lubricant, in the latter case the solid libricant being perferable deposited on the surface with the larger working area. Author

N86-25584# Joint Publications Research Service, Arlington, Va.
SUPERSONIC FLOW ABOUT CONE WITH INJECTION OF GAS THROUGH ITS SURFACE DESCRIBED BY POWER LAW Abstract Only **c34**

A. M. Antonov and v. A. Zakrevskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) date p 56 Transl. into ENGLISH from Doklady Akademii Nauk Ukrainskoy SSR, Seriya A: Fiziko-Matematicheskiye i Tekhnicheskiye Nauki (Kiev, USSR), no. 8, Aug. 1984 p 31-35 Original language document was announced in IAA as A85-10465 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The influence of intensive mass transfer on the supersonic flow of gas about a cone of finite length is investigated. The mathematical model describing the interaction of the primary flow and the transverse flow formed by injection is the boundary problem for a system of equations presented with boundary conditions on the cone and on the contact discontinuity. It is found that the contact surface is nonrectilinear when the injected gas is described by a power law and that the thickness of the layer coming in contact with the cone increases as the intensity of the injection becomes higher. The distribution of the pressure coefficient along a finite cone is calculated as a function of the parameter(s) associated with the injection flow rate, and the Mach number of the oncoming stream. It is found that the pressure coefficient drops off along the generatrix of a cone for all velocities of injection and oncoming stream when the injection is distributed. As the injection intensity increases, the pressure coefficient on the surface increases. Author

N86-25585# Joint Publications Research Service, Arlington, Va.
HIGH-ENERGY DEVICES, OPTICS AND PHOTOGRAPHY c93
K. Borodio *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 76 Transl. into ENGLISH from Sotsilaisticheskaya Industriya (Moscow, USSR), 21 Nov. 1985 p 4 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Using a unit for catching high energy particles form space in an experiment called Pamir, scientists have obtained new data on interactions between these particles and nuclei of atoms of matter. According to a hypothesis of physicists, electromagnetic fields operating in space and in supernova stars which flare up from time to time accelerate particles to energies which are hundreds of thousands or even millions of times as high as those which can be obtained on Earth. Something resembling a layer cake with layers of lead and a special X-ray film in lightproof and waterproof packages was set up on a level area at an elevation of almost 5,000 meters in the Pamir Mountains. This cake covers an area of almost 1,000 square meters. A single X-ray film takes up about a hectare. Particles enter the X-ray emulsion chamber and form spots on the film. The particles energy and the character of their interaction with nuclei of atoms of matter can be judged on the basis of these spots. Author

N86-25586# Joint Publications Research Service, Arlington, Va.
TRANSIENT SCATTERING OF PLANE ACOUSTIC PRESSURE BY PIECEWISE-HOMOGENEOUS PLATE Abstract Only c34
V. A. Galazyuk *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 77 Transl. into ENGLISH from Doklady Akademii Nauk Ukrainskoy SSR, Seriya A: Fiziko-Matematicheskiye i Tekhnicheskiye Nauki (Kiev, USSR), no. 11, Nov. 1984 p 25-29 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Transient scattering of a plane acoustic pressure wave by an elastic piecewise homogeneous plate is an initial value problem for intricate mixed boundary conditions. In the case of an infinitely large plate with a perfectly rigid straight or annular inclusion of uniform width and thickness, this problem is reducible, by the apparatus of Chebyshe-Laguerre polynomials, to a sequence of Fredholm integral equations of the second kind with a regular kernel. It is solved for a plane pulse wave impinging on an infinitely long perfectly rigid inclusion of finite width which constitutes the boundary of an acoustic half-space and for a plane continuous wave impinging on an annular perfectly rigid inclusion of finite uniform width. In both cases the Chebyshev-Laguerre integral transformation yields a sequence of ordinary differential equations. Assuming that the motion of the plate follows the classical theory of flexure, the solution to the problem will depend on only two dimensionless parameters: relative half-width of the inclusion and acoustoelastic modulus of the plate. Author

N86-25587# Joint Publications Research Service, Arlington, Va.
SOLUTION TO PROBLEM OF TRANSIENT DIFFRACTION OF ACOUSTIC WAVES BY INFINITELY LONG OPEN SHELLS Abstract Only c71
V. V. Dykhta *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 78 Transl. into ENGLISH from Doklady Akademii Nauk Ukrainskoy SSR, Seriya A: Fiziko-Matematicheskiye i Teknicheskiye Nauki (Kiev, USSR), no. 11, Nov. 1984 p 33-35 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Special methods are required for solving problems of transient diffraction of acoustic waves by open shells, to ensure that the inverse transformation will restore the original uniquely where exact inverse Fourier transformation will not necessarily succeed. A method has been proposed for this applicable to open shells of arbitrary shape but finite dimensions. The method is demonstrated on an undeformable infinitesimally thin acoustically soft or stiff shell of this class in a boundless initially quiescent acoustic medium. Solution of the corresponding boundary value problem involves a Laplace transformation of the wave equation for sought velocity potentials. The boundary conditions in orthogonal curvilinear system of coordinates are supplemented with asymptotic conditions and conditions at the edge so that the unknown variables can be sought in the form of integro-discrete series expansions in eigenfunctions of corresponding Sturm-Liouville problem. Coefficients of the expansion, for a soft shell or for a stiff shell, respectively, yield an exact solution to the problem. Discretization of the eigenvalue spectrum corresponds to a shell of finite dimensions. Author

N86-25588# Joint Publications Research Service, Arlington, Va.
SOUND ISOLATION IN WIDE CYLINDRICAL TUBE WITH ANNULAR GROOVES IN WALL Abstract Only c71
P. V. Kuznetsov and G. S. Nosko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 80 Transl. into ENGLISH from Akusticheskiy Zhurnal (Moscow, USSR), v. 30, no. 3, May - Jun. 1984 p 395-396 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The acoustic field in a cylindrical tube representing a turbomachine, with a number of equidistant identical annular grooves approximately equal to the number of blades, was analyzed as a field with m-th order symmetry and with the solution to the wave equation being a harmonic function of time as for a multimode waveguide. The already established feasibility of attenuating the mO-mode in a waveguide by means of an array of axisymmetric resonators was experimentally adopted for isolating acoustic noise in a turbomachine. The experimental data on the bandwidth and the attenuation coefficient agree satisfactorily with the predicted performance of resonators optimally designed for given tube volume and groove frequency characteristics. Author

N86-25589# Joint Publications Research Service, Arlington, Va.
HYDRODYNAMIC INTERACTION OF TWO SPHERICAL PARTICLES CAUSED BY SOUND WAVE PROPAGATING ALONG CENTER-TO-CENTER LINE Abstract Only c71
A. P. Zhuk *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 81 Transl. into ENGLISH from Priklaknaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 111-116 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Forces in a two particle system in a fluid with an acoustic field are calculated, specifically for two identical spherical particles some distance apart in a boundless ideal fluid with a plane sound wave propagating along the center to center line. One problem here is diffraction of sound by the downstream particle, formulated as the corresponding wave equation in the potential of the reflected wave field for a given potential of the incident wave field. This problem is solved by the method of separation of variables in spherical coordinates and subsequent reduction, assuming that the particles move in accordance with Newton's second law. The solution yields the resultant force on the downstream particles as consisting of two components, the force of sound radiation pressure and the force of hydrodynamic interaction. The latter is produced by the diffraction field of this particle, without reaction of this particle on the upstream one. The expressions simplify appreciably for long waves, because higher order terms can be discarded. The relations are identical to those for a single spherical particle in a fluid with and acoustic field. Author

N86-25590# Joint Publications Research Service, Arlington, Va.
ACTION OF NONAXISYMMETRIC NORMAL LOAD ALONG SURFACE OF ELASTIC SHELL INTERACTING WITH FLUID Abstract Only c39
V. I. Pozhuyev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 82 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 58-64 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

A coaxial infinitely long pair of a cylindrical shell around a solid cylinder is considered with an ideal compressible fluid filling the channel and interacting with the outer cylinder. The latter is under normal pressure arbitrarily distributed in space, over the length and around the circumference, but constant in time. The problem of a load moving on the surface parallel to axis is solved

by means of integral transformation with respect to the axial coordinate and Fourier series expansion with respect to the angular coordinate. The velocity of the load is assumed to be constant, but of arbitrary magnitude relative to the acoustic velocity in the fluid. Nonaxisymmetric vibrations of the shell are described by equations of dynamics for a Timoshenko shell, with terms added which represent radial damping and reaction of the fluid, while motion of the fluid is described by the wave equation. These equations are solved by integration for boundary conditions of an impermeable inside shell surface and a rigid solid cylinder. The analytical solution of the problem is shown for a self balancing array of loads discrete concentrated around the shell and continuous exponentially decreasing along the shell. Author

N86-25591# Joint Publications Research Service, Arlington, Va.
GENERAL SOLUTION OF SPATIAL PROBLEM OF ELASTICITY THEORY FOR MULTILAYER ORTHOTROPIC CYLINDRICAL SHELL Abstract Only **c39**
A. S. Kosmodamianskiy and V. A. Galich *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 85 Transl. into ENGLISH from Doklady Akademii Nauk Ukrainskoy SSR, Seriya A: Fiziko-Matematicheskiye i Tekhnicheskiye Nauki (Kiev, USSR), no. 8, Aug. 1984 p 46-48 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The separation of variables method is employed to find an analytical solution to the problem of the stress-strain state to an m-layer thick cylindrical shell made of cylindrically orthotropic materials. The curvilinear part of the lateral surface of the shell is assumed to be free of external forces, and the layers are in rigid contact with one another. The problem is formulated as one of finding the displacement vector. The case of normal pressure inside the shell is analyzed as an example. Author

N86-25592# Joint Publications Research Service, Arlington, Va.
NONLINEAR VIBRATIONS OF FLEXIBLE CIRCULAR PLATES UNDER BENDING AND TENSION OR COMPRESSION LOADS Abstract Only **c39**
A. S. Kosmodamianskiy and O. P. Tatarinova *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 86 Transl. into ENGLISH from Doklady Akademii Nauk Ukrainskoy SSR, Seriya A: Fiziko-Matematicheskiye i Tekhnicheskiye Nauki (Kiev, USSR), no. 11, Nov. 1984 p 36-39 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Nonlinear flexural vibrations of a flexible circular plate are analyzed, its edge being either movable on a hinge or movable in a clamp under a uniformly distributed radial tension or compression force which varies harmonically in time. The deflection and the necessarily finite radical membrane force, both functions of the radius and of time, are determined from the corresponding system of nonlinear differential equations for boundary conditions. The problem, formulated in accordance with classical linear theory, is solved by the Bubnov-Galerkin method. The result reveals that the period of nonlinear free vibrations depends on their amplitude. Nonlinear induced vibrations, in the binomial approximation with a fundamental component and a third harmonic only, are characterized by an interdependence of amplitude and frequency (period). Author

N86-25593# Joint Publications Research Service, Arlington, Va.
DYNAMIC EDGE EFFECT IN RIGID HOMOGENEOUS VIBRATION-ABSORBER COATING Abstract Only **c39**
V. B. Stephanov and B. D. Tartakovskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 87 Transl. into ENGLISH from Akusticheskiy Zhurnal (Moscow, USSR), v. 30, no. 3, May - Jun. 1984 p 368-372 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The dynamic edge effect in a rigid homogeneous single layer coating of a vibration absorber material on metal was studied experimentally and is analyzed theoretically, for the purpose of determining its frequency dependence and its manifestation at higher frequencies up to 2500 Hz. First the dependence of the potential strain energy in the coating on the wave dimensions of the latter was determined from the width of resonance peaks of the input admittance and from the shift of resonance frequencies of the flexural vibration modes, after the solid coatings had been split successively into 4, 8, and 16 identical segments, respectively, 0.32, 0.16, and 0.08 m long. The edge effect was then evaluated in terms of the equivalent relative contraction, namely the ratio of the change of segment length to coating thickness. The subsequent theoretical analysis of the frequency dependence is based on an approximate model, a coating of given length, width, and thickness solidly adhering to a vibrating metal bar of given thickness. The scale factor which defines the length of the edge zone is determined from the longitudinal strain and two components of displacement. Solution of the corresponding Lagrange equation by the variational method reveals that the edge effect is maximum when the end of a coating segment coincides with a crest of the bar deformation wave and is minimum when it coincides with a node. Author

N86-25594# Joint Publications Research Service, Arlington, Va.
STABILITY OF NONCIRCULAR CYLINDRICAL SHELLS UNDER AXIAL COMPRESSION Abstract Only **c39**
N. P. Semenyuk *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 88 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 43-49 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

Stability of cylindrical shells with corrugated cross section under axial compression is analyzed exactly, on the basis of Kirchhoff-Love hypotheses with variation of the thickness metrics and according to a shown variational criterion and with Fourier series expansion of the displacement components. For illustration it considered a shell on hinge supports with a generatrix in a polar system of coordinates. Calculation of the critical load and the buckling mode reveals that the number of possible buckling modes increases but the order of the system of equations does not change as the number of corrugation waves increases. The procedure was applied to shells with mean radius R sub 0 = 0.2 m and length L = 0.4 m, of a material with Youngs modulus E = 7.2 times 10.000 MPa and Poissons ratio upsilon = 0.3, having various corrugations with amplitude epsilon = (0.1-48)t/R and number of waves N = 5-48. The results indicate that such shells with N < 30 are less stable than the circular shell with radius R sub 0, the shell with N = 7 being least stable of all. Their buckling modes are also compared to those of the circular shell, and the classical theory is found to be applicable here too. Author

N86-25595# Joint Publications Research Service, Arlington, Va.
OPTIMIZATION OF CYLINDRICAL SHELLS WITH VARIABLE THICKNESS FOR AXISYMMETRIC LOAD Abstract Only **c39**
N. G. Medvedev and N. P. Totskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 89 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 53-57 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The problem of the weight optimization of axisymmetrically loaded closed cylindrical shells of variable thickness is analyzed for the case where a function of the shell thickness is the control variable, with constraints imposed on the shell strength and thickness. For hinged and clamped support conditions, optimum laws of shell thickness variation are found which result in a weight advantages over shells of constant thickness. V.L.

N86-25596# Joint Publications Research Service, Arlington, Va.
SPECTRUM OF NORMAL WAVES IN HOLLOW TRANSVERSELY ISOTROPIC CYLINDER Abstract Only **c39**
V. A. Moiseyenko, V. I. Storozhev, and N. A. Shulga *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 89 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 117-118 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

The spectrum of axisymmetric normal waves in a hollow transversely isotropic cylinder is calculated from the corresponding system of two differential equations of motion. The amplitude components of the stress tensor are related to the amplitude components of the displacement vector through Hooke's law, with both the inside and outside surfaces of the cylinder assumed to be stress free. Equating the characteristic determinant to zero yields the dispersion equation, and solution of the latter yields the relation between the dimensionless wave number and the frequency parameter for given ratio of outside radius to inside radius and the given set of five elasticity parameters (three stiffness moduli and two shear moduli). A numerical analysis for a beryllium cylinder has yielded dispersion curves characterizing modes which converge but do not intersect. Author

N86-25597# Joint Publications Research Service, Arlington, Va.
NATURAL VIBRATIONS OF SPHERICAL SHELLS REINFORCED WITH MERIDIONAL HOOPS Abstract Only c39
V. N. Revutskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 90 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 119-121 Original language document was announced in IAA as A85-11595 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

A method allowing for the discrete placement of ribs is used to investigate the effect of rib parameters on the natural frequencies and modes of a clamped spherical shell stiffened by periodic meridional ribs. It is found that the mass of the meridional ribs affect the lower frequencies of the natural vibration of the shell to a greater extent than does the stiffness of the ribs. Consequently, the use of meridional ribs reduces the lower frequencies of natural vibration in comparison with a smooth shell. V.L.

N86-25598# Joint Publications Research Service, Arlington, Va.
THEORY OF NONLINEARLY ELASTIC MULTILAYER SHELLS WITH TRANSVERSE SHEAR STRAIN Abstract Only c39
V. Ye. Verizhenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 90 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 124-127 Original language document was announced in IAA as A85-11596 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

For the case of a nonlinearly elastic layered shells, more accurate expessions are obtained for the tangential components of the displacement vector, with allowance made for deformations of transverse shear. The expressions and their particular cases make it possible to obtain vesions of a physically nonlinear nonclassical theory for calculating layered shells. These can be used for describing, with a specified accuracy, the stress-strain state of layered thin walled objects of varying complexity. V.L.

N86-25599# Joint Publications Research Service, Arlington, Va.
USSR REPORT: ENGINEERING AND EQUIPMENT
7 Feb. 1986 115 p refs Transl. into ENGLISH from various Russian articles
(JPRS-UEQ-86-002) Avail: NTIS HC A06/MF A01

Topics on engineering and equipment from foreign newspapers, periodicals, books, and news agency transmissions and broadcasts discussed include: aeronautics, shipbuilding, nuclear energy, aerospace engineering, energy technology, industrial technology, navigation and guidance systems, and materials testing. For individual titles, see N86-25600 through N86-25649.

N86-25600# Joint Publications Research Service, Arlington, Va.
AN-124 AIRPLANE'S CARGO-HANDLING AND AUTOMATION EQUIPMENT
T. Kuznetsova *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 1-2 Transl. into ENGLISH from Pravda Ukrainy (Kiev, USSR), 26 May 1985 p 1 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

Development of the wide-body transport aircraft AN-124 is described. The aircraft has a large payload capacity, an airspeed of 800 to 850 kilometers an hour at an altitude of 10 to 12 kilometers, one third the fuel consumption, and the ability to use runways that are not concrete. The AN-124 is equipped with the latest navigation and piloting equipment, as well as an automated electrohydromechanical control system with quadruple redundancy, which ensures a high degree of reliability. The aircraft is also equipped with an onboard automatic monitoring complex which oversees all parameters, runs a comparison check, and warns ground services in the event of a malfunction. B.G.

N86-25601# Joint Publications Research Service, Arlington, Va.
INFORMATION ON NEW AN-124 GIANT CARGO PLANE Abstract Only c05
N. Dombkovskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 4 Transl. into ENGLISH from Trud (Leningrad, USSR), 23 May 1985 p 1 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

The dimensions and capabilities of the AN-124 cargo aircraft are described. The problems that were involved in the aircraft design are also characterized. B.G.

N86-25602# Joint Publications Research Service, Arlington, Va.
DATA ON MI-26 HELICOPTER Abstract Only c05
L. Chernov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 7-8 Transl. into ENGLISH from Kommunist (Moscow, USSR), 19 May 1985 p 4 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

The MI-26 helicopter, which has the highest payload capacity of any existing helicopter, can transport items that weigh more than 20 tons over long distances in severe climatic conditions. The helicopter is used in the construction of bridges and other structures, and in the delivery and installation of heavy equipment for industrial enterprises and drilling rigs in remote areas. The increased power of the MI-26 was achieved through the use of new materials, structural design, and two economic D-136 gas turbine engines. The design and arrangement of the MI-26 systems make ground maintenance possible without special airfield equipment. An auxiliary power unit ensures the prolonged operation of the helicopter. For mechanization of loading operations, the cargo bay is equipped with two electric winches and a hoisting mechanism which can handle cargo items up to 5 tons each. With a length of 15 meters, the cargo bay can easily hold two trucks or motor buses. B.G.

N86-25603# Joint Publications Research Service, Arlington, Va.
ROLE OF OPTIMIZATION METHODS IN IMPROVEMENT OF FLIGHT CONTROL FOR AIRPLANES Abstract Only c08
G. M. Kashin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 10 Transl. into ENGLISH from Standarty i Kachestvo (Moscow, USSR), no. 12, Dec. 1984 p 15-18 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

While conventional computer aided automatic flight control alone improves the static and dynamic characteristics of aircraft, active automatic control can further improve the flight mechanics by means of reduction of takeoff mass. Such a control system is capable of performing other additional functions as well, namely relaxing the constraints on natural static stability, reducing the loads involved in maneuvers, increasing the stability margin under flutter, damping elastic vibrations in a turbulent atmosphere, direct control of lift and lateral forces, improving the flight aerodynamics, prevention of dives and spins, and improving passenger comfort. The stability margin is reduced by increasing the stability level. The design of such a system is based on analysis of surges and vibrations, requires inclusion of corrective filters, and calls for optimization of the control algorithm for the special application. One approach proposed is the approach taken for optimizing the parameters of standardization objects. Author

N86-25604# Joint Publications Research Service, Arlington, Va.
TECHNICAL-ECONOMIC FEASIBILITY OF ORBITING SUN-

LIGHT REFLECTORS Abstract Only c44
Zh. Alferov and V. Minin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 26-27 Transl. into ENGLISH from NTR: Problemy i Resheniya (Moscow, USSR), 19 Feb. 1985 p 6 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

The use of deflectors in orbit as a means of providing artificial illumination is examined. Considerations of technical and economic feasibility are addressed. Three main areas of application are distinguished: reflecting sunlight onto the surface of the Earth; concentration of the flow of solar energy on an orbiting receiver; and retransmission of optical radiation. The advantages of the artificial Earth illumination application of the orbiting reflector scheme in terms of energy savings in lighting cities, and additional daylight time for critical periods of farming operations are discussed. B.G.

N86-25605# Joint Publications Research Service, Arlington, Va.
HIGH-SPEED HIGH-VOLTAGE AMPLIFIER Abstract Only c33
A. N. Dyachko, V. N. Ilyushenko, and V. I. Tuyev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 28 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 237-238 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A high speed amplifier of high voltage pulse signals coming from remote sources over long transmission lines is now available, specifically designed for increasing the sensitivity of 6 LOR-02 oscillographs. It includes a line attenuation compensator, besides the amplifier stage with a main output and an output for oscillograph synchronization. Each component can be used independently for any particular other application. The amplifier delivers negative voltage pulses of 300 V or higher amplitidue and 200 ns duration at a repetition rate of 10 kHz or higher to a 75 ohm load, with rise and fall times not exceeding 3 ns and with the pulse top flat within 10%. Its gain is 66 dB with manual regulation over a 40 dB range, its dynamic range is 40 dB at the input, and its amplitude characteristic is linear within 15% over the 30 to 300 V range. The amplifier stage uses a 60 V power supply and draws 0.9 A, the attenuation compensator uses a 15 V power supply and draws 0.15 A. Author

N86-25606# Joint Publications Research Service, Arlington, Va.
MULTICHANNEL RING COMMUTATOR FOR HIGH-CURRENT ACCELERATORS Abstract Only c33
I. F. Isakov, Ye. I. Logachev, and G. Ye. Remnev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 28-29 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 21-23 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A ring commutator with parallel channels in a common gas chamber and with a switching capability of 0.4 MA under 1 MV was developed for high current accelerators. The feasibility of such a commutator was established in an experimental study of dischargers and their triggering by distortion of the electric field. The necessary distortion is achieve by inserting the auxiliary electrode asymmetrically from the side and grounding it through the discharger and a current limiting resistor. Mutual brightening illumination of parallel discharger improves the stability of the triggering; a 30 to 40% smaller variance of the delay time is quite feasible. The commutator has an inductance of 40 nH, and its working medium is an elegas+nitrogen mixture in a 1:10 ratio under a 0.5MPa pressure. It was tested in the TO-NUS-1 accelerator, where switching through a twin shaping line did not delay the triggering by more than 22 ns at a 0.9 ratio of control breakdown voltage to a self sustained breakdown voltage. Author

N86-25607# Joint Publications Research Service, Arlington, Va.
HIGH-CURRENT ELECTRON ACCELERATOR Abstract Only c33
B. V. Alekseyev, I. M. Gorelikov, V. I. Kazurov, L. V. Mashkov, A. G. Greshko, G. I. Soklakov, A. I. Fedorenko, and K. B. Yurekevich *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 29 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 19-21 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A high current electron accelerator was developed and built on the basis of computer aided design calculations and electrolytic trough simulation. A 15 stage Arkadyev/Marx pulse voltage generator serves as the primary energy storing device. Each stage consists of two IK-100-0.4 capacitors connected in parallel and all immersed in transformer oil inside a metal container on electrically insulating posts. Each stage is shielded on both the positive and negative potential side. The shields, made of copper foil, not only smooth the electric field in the clearances but also constitute part of the commutating circuit and contribute to reduction of the overall generator size. The pulse voltage generator is triggered by a synchronizer through the conventional firing circuit of a TGI1-350/16 thyratron. To operate the accelerator in the nanosecond mode, the generator discharges into a diode through a twin shaping line. In this mode the accelerator can produce 0.8 MeV to 240 kA electron beams of 0.8 ns duration. To operate in the microsecond mode, the shaping line acts as storing capacitor, and the discharge gaps must be charged with polarity reversal in each stage. In this mode the accelerator can produce 0.5 MeV to 10 kA electron beams of 1 microsecond duration. Author

N86-25608# Joint Publications Research Service, Arlington, Va.
PLASMATIC ION SOURCE Abstract Only c33
A. P. Semenov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 30 Transl. into ENGLISH from Plasmatic Ion Source (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 23-24 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A plasmatic ion source was built in which the hollow cathode above the two discharge chamber cathodes is readily replaced upon depletion after 250 to 300 h. The emission outlet hole is restored to original size by replacement of the cathode insert, while gas is continuously admitted by means of a spring mechanism. The source operates in the Penning discharge mode, with argon as the working gas. The hollow cathode is 36 mm long and has an inside diameter of 4 mm. The other two cathodes serve as pole shoes of a toroidal ferrite magnet which produces a longitudinal magnet field of 0.1 T induction in the discharge chamber. All three cathodes are made of magnetic steel and are insulated from cylindrical copper anode by teflon spacers. Heat is dissipated by oil, which carries it away to a water cooled housing compartment. The source generates an ion emission current of 20 mA with a discharge current of 200 mA at a pull voltage of 20kV. Author

N86-25609# Joint Publications Research Service, Arlington, Va.
DESIGN OF PNEUMOHYDRAULIC ACCUMULATORS WITH HIGH-COMPRESSIBILITY ENERGY STORING MEDIUM Abstract Only c75
S. G. Telitsa and L. M. Vinogradov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 31 Transl. into ENGLISH from Izvestiya Vysshikh Uchebnykh Zavedeniy: Energetika (Minsk, USSR), no. 11, Nov. 1984 p 95-97 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A pneumohydraulic accumulator for a hydraulic drive was designed to ensure that the volume of fluid satisified the requirements of the drive without being excessively large. It is required that during discharge of the fluid from the accumulator tank its pressure does not drop below the drive operating level. The design of such operators is based on the equation of the polytropic process. A preliminary estimate of the thermodynamic indicators was necessary before the optimum mixture for maximum useful work and faster response and maximum economy of metal in the tank structure can be determined. The accumulator work cycle was treated as a 2-stage cycle of isothermal charge and polytropic discharge. The calculations, based on pressure/volume diagrams of both processes, are used to determine the volume of fluid delivered and the accumulator. Numerical data based on these

relations and typical operating conditions were obtained for optimum mixtures corresponding to various durations of the discharge process. B.G.

N86-25610# Joint Publications Research Service, Arlington, Va.
CHARACTERISTICS OF SOLAR CELLS WITH SCHOTTKY BARRIER AND CURRENTS THROUGH SURFACE STATES Abstract Only **c37**
O. S. Zinets, S. S. Kilchitskaya, and V. I. Strikha *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 32-33 Transl. into ENGLISH from Geliotekhnika (Tashkent, USSR), no. 6, Nov. - Dec. 1984 p 8-13 Original language document was announced in IAA as A85-24047 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

Characteristics of Schottky barrier cells are calculated in the context of the diode theory of amplification for the case of a thin intermediate layer, with allowance made for the passage of charge carriers through the surface electron states. Particular cases of the predominant charge carrier transfer between the surface electron states and one of the semiconductor bands are examined. It is shown that the presence of surface electron states, which provide a channel for the migration of photocarriers into the metal, may increase the efficiency of Schottky barrier solar cells when the interlayer thickness is greater than the optimum thickness calculated without allowance for such transfer. V.L.(IAA)

N86-25611# Joint Publications Research Service, Arlington, Va.
ROBOT DRIVE MECHANISM USES CONVENTIONAL ELECTRIC MOTORS Abstract Only **c44**
I. Demchenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 44-45 Transl. into ENGLISH from Sotsialisticheskaya Industriya (Moscow, USSR), 16 May 1985 p 4 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

The development and use of three phase asynchronous electric motors in robot technology are presented. The mechanical arm of a robot has as many drives as it has joints. Manipulators in use in modern industry must have six to nine degrees of mobility, and experimental prototypes with 18 coordinates of movement are already developed. A simple, common, and inexpensive industrial electric motor is proposed for use in the robots. This motor was previously considered unsuitable for delicate work because of its low precision in executing commands and the difficulty in controlling it. Control methods were developed to overcome this difficulty. Integrated microcircuits and a power converter control the operation of the single motor. A cassette made up of six units controls the operation of the whole mechanical arm. This cassette is linked with the brain of the robot (a microprocessor system or microcomputer). B.G.

N86-25612# Joint Publications Research Service, Arlington, Va.
AIR-HYDROGEN ELECTROCHEMICAL GENERATOR Abstract Only **c37**
F. Danilovskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 49 Transl. into ENGLISH from Nedelya (Moscow, USSR), 25 Apr. - 5 May 1985 p 4 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

Soviet scientists have developed an original air/hydrogen electrochemical generator (EKHG) which can replace storage batteries in many instruments and apparatuses. Moreover, broad employment of this device will save a large amount of scarce nonferrous metals that are needed also for the production of small electric batteries. It is based on fuel cells in which chemical energy is converted into electrical energy. Design complexity and high production cost long prevented the original idea for such cells from being embodied in experimental prototypes. A working model of a fuel cell was not developed until the 1960s. Now generators developed on the basis of such cells can be serially produced. Such a generator is dependable and simple to use, and it performs well in different kinds of field conditions. It can be carried from place to place in a backpack. The efficiency of the generator can be as high as 70 percent. This opens up broad possiblilities for employing such generators in electric motor vehicles. Author

N86-25613# Joint Publications Research Service, Arlington, Va.
FATIGUE DEFECT TRANSDUCER AND VALIDATION OF ITS USABILITY Abstract Only **c33**
V. T. Troshchenko and V. I. Boyko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 54-55 Transl. into ENGLISH from Problemy Prochnosti (Kiev, USSR), no. 1, Jan. 1985 p 3-8 (For primary document see N86-25599 16-13)
(Rept-1) Avail: NTIS HC A06/MF A01

A technology for producing a fatigue defect transducer and a methodology for using it for reliable prediction of performance margins and available life of structures were developed on the basis of irreversible changes in the electrical resistance of metals under cyclic strain. Such a transducer actually indicates the history of cyclic loading. The transducer, featuring excellent metrological characteristics along with small size and simple design, was built with annealed constantan foil according to the technology of conventional KF4 resistive strain gauges. Its main characteristics are base size 5.0 mm, initial electrical resistance 94 to 105 ohms, operating range of resistance variation 0.5 to 6.0 ohms with 5 to 30% variance, operating temperature range 103 to 308 K, operating range of cyclic strains 0.0011 to 0.0025 with 0.0011 as the sensitivity threshold, and endurance limit 0.0013 to 0.00245 on the base of 10(7) to 10(5) cycles. In practice the lines of constant transducer resistance change do not always coincide with the fatigue curves of the monitored object. The transducer is effective only when the fatigue curves of a material lie within the operating range of the transducer. This requires extending that range, by means of a device for attenuating or amplifying the transducer strain under a given object strain. Author

N86-25614# Joint Publications Research Service, Arlington, Va.
STABILIZER OF SHAFT ROTATION ANGLE FOR D.C. COMMUTATOR MOTOR Abstract Only **c35**
S. N. Nizovoy, F. G. Kuliczhanov, and N. O. Yelyutin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 55 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 230-231 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A stabilizer of shaft rotation angle for d.c. commutator motors is described which suppresses speed fluctuation caused by a change in the armature current as successive commutator bars reach the leading edge of a brush. This is achieved by inserting a low series resistance into the armature circuit and feeding the voltage across it to a servo oscillograph so that the frequency of the driven sweep becomes a multiple of the shaft speed. Return-stroke sweep pulses are extracted from the sawtooth voltage wave by a shaping circuit which consists of one capacitor, one resistor, two diodes, and one trigger. After a specified number of pulses has accumulated, another trigger actuates a switch which disconnects the motor from the voltage supply. A single starting pulse at the output of another shaping circuit records a specified number in the same pulse counter, through arrays of switches, and sets the same trigger for reconnecting the motor to the voltage supply. This stabilizer was tested on a positioning table driven by an MN-250 motor with 6-bar commutator, using an S1-19B oscillograph. The motor was started in steps for rotation in 3 minute steps, and the table position was measured after each 20 steps by means of a theodolite within + or - 4 sec accuracy. The average instability of the rotation angle between measurements did not exceed + or 30 sec. Author

N86-25615# Joint Publications Research Service, Arlington, Va.
DESIGN OF VIBRATION MACHINES WITH INERTIAL EXCITATION Abstract Only **c37**
N. N. Bolotnik *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 56 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela

(Moscow, USSR), no. 1, Jan. - Feb. 1985 p 59-66 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A perfectly solid platform which is horizontal when at rest is mounted on a stationary foundation between two walls through two pairs of generally unequal springs; the foundation springs limit its vertical motion and the wall springs limit its horizontal motion. This platform is set in plane-parallel motion by an inertial vibration exciter mounted on it and consisting of two identical unbalanced rotors which spin in opposite directions at the same constant speed on a common shaft, this shaft being horizontal so that the platform moves in the vertical plane only. The problem is formulated in two systems of Cartesian coordinates, a movable one and inertial one with a common origin at the point at one end of the platform where one set of springs is attached. The x,y axes of the inertial system remain, respectively, horizontal and vertical, while x-axis through the point at the other end of the platform where the other set of springs is attached and the y-axis perpendicular to it move with the platform. The motion is described in terms of kinetic energy and potential energy, whereupon small vibrations of the platform are considered which allow, with sufficient accuracy, linearization of the corresponding Lagrange equations. The design problem is to find a set of values of the system parameters which will ensure stable 2-periodic vibrations of the system corresponding to translatory motion of the platform; such a motion occurs only when the orientation of the movable x-axis relative to the inertial (horizontal) x-axis remains constant. Author

N86-25616# Joint Publications Research Service, Arlington, Va.
EFFECTIVENESS OF STRUCTURAL COUNTERMEASURES FOR REDUCING BLADE VIBRATIONS EXCITED BY RANDOM FLOW FLUCTUATIONS Abstract Only c37
D. M. Bavelskiy, G. I. Bogoradovskiy, G. L. Guirskiy, and M. S. Pomanychev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 57 Transl. into ENGLISH from Problemy Prochnosti (Kiev, USSR), no. 1, Jan. 1985 p 51-53 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A study of blade vibrations in the prototypes GTN-25 gas pumping set by the discrete-phase method has revealed such vibrations in the first stage of the high-pressure compressor, vibrations at frequencies not multiples of the runner speed as well as normal resonance vibrations. These anomalie occurred throughout the entire range of runner speed; their intensity increased with that speed. Readings of low-inertia pressure fluctuation transducers placed before the guide vanes on the compressor inlet side and spectral analysis of these readings, aided by visual inspection and analysis of compressor-turbine aerodynamics, indicated an absence of flow separation as the possible cause. Instead, they indicated a nearly white noise distribution of those fluctuations, with a predominance of random fluctuations in the low-frequency range and characterized by a background level comparable with or even exceeding the level of runner speed harmonics. The remedy then proposed and implemented was a buildup of the inlet tube for smoothing its surface contour along the stream and a reorientation of the channel walls to make them parallel with the stream boundary. Author

N86-25617# Joint Publications Research Service, Arlington, Va.
EXTENDING RANGE OF STABLE OPERATION OF AXIAL COMPRESSORS BY MEANS OF SELF-ROTATING INLET GUIDE VANES Abstract Only c37
V. S. Knyazev and V. L. Zhokhov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 57-58 Transl. into ENGLISH from Energomashinostroyeniye (Moscow, USSR), no. 2, Feb. 1985 p 7-9 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

An array of self-rotating guide vanes was developed for axial compressors. Its purpose was to extend the range of stable operating speeds. Its characteristic feature is that the vanes, made of steel strip, have a biconvex S-profile so that the array in effect behaves as a combination of aerodynamically matched compressor and turbine mounted on the same shaft and rotating at the same speed. Two designs were tested, and their performance was evaluated over the 750-1000 rpm range of runner speed, with the Mach number of the air stream N sub M = 0.1-0.12 and with the Reynolds number N sub R = (1.8-2.0) x 10 to the 5th power. The theoretical pressure coefficient was calculated from torque readings taken on a d.c. balancing dynamometer. The flow coefficient was calculated from readings of the air rate at the inlet. The runner speed and the speed of the vanes were measured by the contactless method with stroboscope and markers. The results reveal that, by decreasing the pressure coefficient slightly to 0.015, it has been possible to lower the cutoff air rate by 9.4-1.2% and the cutoff runner speed by 13.6-17.8%. Author

N86-25618# Joint Publications Research Service, Arlington, Va.
PERIODIC MOTION OF SATELLITE RELATIVE TO CENTER OF MASS WITH UNIAXIAL ORIENTATION IN GRAVITATIONAL FIELD Abstract Only c37
V. V. Sazonov and M. Ye. Sidoryuk *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 68 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 3-13 Original language document was announced in IAA as A85-28901 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

The motion of a satellite relative to its center of mass due to a gravity moment in circular orbit is analyzed using an autonomous system of ordinary differential equations of the sixth order to describe the motion. The symmetric periodic solutions to this system, which are close to the periodic solutions to the corresponding generating system, are investigated analytically and numerically. Some of the solutions describe periodic oscillations or rotations of the satellite relative to the axis of the minimum moment of inertia aligned approximately along the radius-vector of the satellite center of mass relative to the center of attraction. It is suggested that these motions be used for the single-axis gravity gradient stabilization of the satellite. Author

N86-25619# Joint Publications Research Service, Arlington, Va.
MOTION OF SATELLITE RELATIVE TO CENTER OF MASS CAUSED BY MOMENTS OF LIGHT-PRESSURE FORCES Abstract Only c18
D. D. Leshchenko and A. S. Shamayev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 69 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 14-21 Original language document was announced in IAA as A85-28902 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

It has been estimated in an earlier study that at heights exceeding 35,000-40,000 km above the Earth, the force moments of light pressure have greater effect on space vehicles than any other perturbing force moments. Here, the motion of a spacecraft with a triaxial ellipsoid of inertia relative to its center of mass due to light pressure force moments is analyzed for the case where the spacecraft is a body of revolution. The analysis is based on the averaging method. Author

N86-25620# Joint Publications Research Service, Arlington, Va.
DYNAMICS OF ORIENTING AND STABILIZING SYSTEMS FOR SPACECRAFT WITH CONTROLLABLE GRAVITATIONAL STABILIZER Abstract Only c18
Ye. M. Potapenko *In its* USSR Report: Engineering and Eduction (JPRS-UEQ-86-002) 7 Feb. 1986 p 69-70 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 22-30 Original language document was announced in IAA as A85-28903 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

This paper is concerned with the dynamics of a spacecraft with a contrc'led gravity gradient stabilizer in the form of a long thin-walled boom having a load at its free end and mounted in a

two-degrees-of-freedom controlled suspension at the other end. The use of various auxiliary mechanisms for vibration damping, such as flywheels, gyroscopes, jet engines, and electromagnets, is discussed. Attention is also given to the effect of the elasticity and deflections of the stabilizer boom on the stability of the spacecraft motion. Expressions are obtained allowing the analysis, synthesis, and comparison of the systems under study. Author

N86-25621# Joint Publications Research Service, Arlington, Va.
CORRECTION OF SPACE TACHOMETER - STABILIZING GYRO SYSTEM Abstract Only **c18**
A. I. Tkachenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 70 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 31-36 Original language document was announced in IAA as A85-28904 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

In an earlier study (Tkachenko, 1983), a method was presented for the calibration and refinement of the attitude of a three-dimensional angular velocity meter, mounted on a moving object, on the basis of exact angular information on the position of a coordinate trihedron connected with the object. In the present study, the same problem is solved for the case where the angular data contain small errors of the known kind which have to be evaluated along with the error of the three-dimensional angular velocity meter. The effect of errors in reading primary information on the accuracy of calibration and correction is disscussed and ways to minimize this effect are examined. Author

N86-25622# Joint Publications Research Service, Arlington, Va.
HARMONIC VIBRATIONS OF VISCOELASTIC SHELLS OF PIEZOCERAMIC MATERIAL WITH ATTENDANT HEATING Abstract Only **c19**
V. G. Karnaukhov and I. F. Kirichok *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 71 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 21, no. 2, Feb. 1985 p 60-67 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A thermomechanical theory on the basis of Kirchhoff-Love hypotheses is constructed for vibrations of thin ceramic shells in piezoelectric transducers, considering that the material is viscoelastic and its properties are temperature-dependent. The equations of state and of motion are derived from three-dimensional equations of electroelasticity with mechanical intensity as independent variables. The resulting system is one of coupled equations which thus takes into account the interaction of mechanical, thermal, and electric fields. Axisymmetric radial vibrations of normally polarized infinitely long cylindrical shells and closed spherical shells are typical examples for which these equations are readily solvable. Accordingly numerical results are shown for a spherical shell of PZT-4 ceramic material with vacuum inside and water outside. Author

N86-25623# Joint Publications Research Service, Arlington, Va.
APPROACH TO TACKLING PROBLEMS OF WRINKLED STATE OF SOFT SHELLS Abstract Only **c39**
V. S. Kalinin and A. S. Melamud *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 71-72 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 21, no. 2, Feb. 1985 p 67-73 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A new approach is proposed for solving problems of the wrinkled state for soft shells, namely treating a wrinkled shell as a smooth biaxial one in the zero-moment state. This eliminates the need to first determine the directions of wrinkles. Instead, the length of an arc element of any curve on the shell surface is defined as the distance between two points in three-dimensional space, this distance being sufficiently small before deformation to allow replacing the arc with a straight line segment but also sufficiently large so as not to depend on the locations of the two points on each wrinkle. This distance is then, in a sufficiently high order of precision, proportional to the differential of the corresponding Lagrange coordinate. The relation between internal forces and global strains, the latter representing changes in the surface metrics and ignoring local effects, is established accordingly on the basis of negligible compressive stresses in the real shell after stability loss and negligible normal stresses along the wrinkles. An isotropic shell material is considered first, in which case global and local strains along the wrinkles become the same. The resulting relations between corresponding stress tensor and strain tensor components can, however, also be used as the first approximation for an only slightly deformable anisotropic shell material. Author

N86-25624# Joint Publications Research Service, Arlington, Va.
EXPERIMENTAL STUDY OF TRIPLE-LAYER SPHERICAL SHELLS UNDER NONUNIFORM PRESSURE Abstract Only **c39**
V. U. Kotelnikov and V. G. Tarasenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 72 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 21, no. 2, Feb. 1985 p 117-119 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

Hemispherical shells consisting of three variable-thickness layers were studied to determine their behavior under nonuniform external pressure. The two outer sheath layers were made of AMTs-M aluminum alloy, with a filler between them and with a metal flange 13.7x50 sq mm in the cross-section around the bottom base edge. Two batches of 10 shells were tested. All shells had an inside diameter of 400 mm and a 14 mm thick filler. The tests were performed in an array of six annular chambers with elastic walls, all six wrapped with a common jacket so as to prevent tangential motion and each inflatable to a different pressure. Measurements were made with PKB resistive strain gauges on a 10 mm base and readings were recorded with a TsTM-3 digital bridge instrument. The results indicate higher stresses and larger strains in the sheath directly under the pressure load. Author

N86-25625# Joint Publications Research Service, Arlington, Va.
INDUCED VIBRATIONS OF SPHERICAL SHELL IN ACOUSTIC WEDGE Abstract Only **c39**
M. A. Potapov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 73 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 21, no. 2, Feb. 1985 p 53-60 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A spherical shell of an elastic and isotropic material with a concentric solid vibrating sphere inside is placed between two plane walls intersecting so as to form a wedge. The acoustic field in such a wedge is described by two Helmholtz equations for the regions inside and outside the shell, respectively, supplemented with three equations of motion for the shell. Boundary conditions are stipulated at the surface of the wave-emitting sphere, at the median surface of the shell as the interface between the two regions, and at the wedge walls. The media inside and outside the shell are characterized by the products of their respective density and acoustic velocity. The problem of shell vibrations is solved by the method of virtual images with the wedge angle o =-q as discrete parameter (q= 1,2,...). With the solution sought in the form of a series with spherical Bessel functions and associated Legnedre polynomials, an infinite system of linear algebraic equations is obtained which has a normal determinant and an upper bound is obtained which converges. This system of equations is quasiregular, solvable by the method of reductions, and the series can be evaluated asymptotically. Numerical results have been obtained for a steel shell with a vibrator and between perfectly rigid walls of a wedge. Author

N86-25626# Joint Publications Research Service, Arlington, Va.
CERTAIN RELATIONS FOR SYSTEMS WITH DRY FRICTION Abstract Only **c39**
V. I. Levitas *In its* USSR Report: Engineering and Equipment

(JPRS-UEQ-86-002) 7 Feb. 1986 p 73-74 Transl. into ENGLISH from Doklady Akademii Nauk SSSR (Moscow, USSR), v. 280, no. 1, Jan. 1985 p 52-56 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A definition of friction force is proposed, which is more precise than merely in terms of positive power and from which an associated law of friction corresponding to the orthogonality principle in the theory of plasticity will follow as corollary. This definition is based on the Lagrange equations of motion for a system with stationary holonomic couplings, with m degrees of freedom, and with dry friction. The conventional definition is accordingly supplemented with the postulate of dissipation and constraints. Author

N86-25627# Joint Publications Research Service, Arlington, Va.
ENERGY CRITERION OF DYNAMIC SNAP-OVER FOR ELASTIC SPHERICAL SHELLS Abstract Only **c39**
L. S. Srubshchik *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 74 Transl. into ENGLISH from Doklady Akademii Nauk SSSR (Moscow, USSR), v. 280, no. 1, Jan. 1985 p 60-63 Original language document was announced in IAA as A85-24178 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

The critical loads of the dynamic snap-through of spherical shells are estimated for the principal types of boundary conditions using steady-state equations. The estimates are based on the concept of the astatic critical load, i.e., the minimum load required for the transition to unstable postcritical equilibrium with a potential energy equal to the initial potential energy of the shell. For the case of thin shells with simply supported and hinged edges, asymptotic formulas for the astatic critical loads are obtained and generalized to ellipsoidal shells. For hinged shells, the possibility of a snap-through under impulsive loading is demonstrated, and critical loads are calculated. Author

N86-25628# Joint Publications Research Service, Arlington, Va.
WIDE-ANGLE INSTRUMENT FOR MEASURING DIVERGENCE OF LASER BEAM Abstract Only **c39**
Yu. A. Pokrovskiy, Ye. A. Makaretskiy, and Yu. S. Khurkhulu *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 75 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 240 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

An instrument for measuring the divergence of laser beams and displaying the power distribution over the beam cross-section is now available, its main features being small size and fast measurement. It consists of a goniometric resonance filter-analyzer and a deflecting mirror. The filter is made of two glass prisms separated by an air gap between their diagonal facets. The dependence of its transmission coefficient on the angle of radiation incidence is analogous to the resonance characteristics of an electric LC-circuit. The angle range, analogous to the frequency band of an electric filter, is 5 x 10 to the minus 5 power - 2 x 10 to the minus 2 power rad, with a resolution of up to 2.5 x 10 to the minus 5 power rad. The deflecting mirror serves a means of varying the incidence angle, and thus also the transmitted radiation power proportionally to its angular distribution. The latter is displaced on the screen of a cathode-ray oscillograph by a signal from the photoreceiver behind the angle filter. The instrument can handle laser beams with a diameter of up to 50 mm and a radiation power of up to 50 W. Author

N86-25629# Joint Publications Research Service, Arlington, Va.
UNIVERSAL INSTRUMENT FOR ACOUSTIC INSPECTION Abstract Only **c35**
Ye. G. Nashuk, V. D. Beshentsev, and A. Sh. Atayev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 75-76 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 242 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

An instrument for wide-range nondestructive inspection of materials and products by measurement of either the ultrasound velocity and absorption coefficient or the acoustic emission activity is discussed. The former are measured by the echo-pulse method; high resolution is attained by conversion to a time interval relative to selected zero-crossovers and subsequent discretization of that interval. Any of the first 16 echo pulses in a pulse train can be delayed. The operating frequency range in this mode is 1 to 15 MHz, the time intervals between pulses are indicated on a 5-digit display with 100, 10, or 1 ns units of the last digit and with a resolution of up to t or - 2 ns. Acoustic emission activity is measured, and indicated on a 3-digit display, after amplification of the signal by a low-noise extension preamplifier and truncation of its frequency spectrum by a filter array. The sensitivity is 5 mu V and the passband is 60 to 400 kHz in this mode of operation. Author

N86-25630# Joint Publications Research Service, Arlington, Va.
FIVE-CHANNEL INSTRUMENT FOR ACOUSTIC FLAW DETECTION BY METHOD OF ACOUSTIC EMISSION Abstract Only **c35**
A. I. Alabichev, Yu. I. Tyalin, Yu. I. Golovin, A. A. Sletkov, V. I. Uskov, S. A. Gladyshev, and A. N. Bykov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 76 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 243 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A five-channel instrument for detecting and recording acoustic emission from defects which develop during welding, cooling or loading is discussed. It contains a +12, -12, +24 V power supply, a control module for automatically regulating the number of acoustic emission pulses and their intensity, and five identical measuring channels. Each channel consists of a high-pass filter, an attenuator, a linear amplifier, an intensity meter, and a piezoelectric transducer with an extension preamplifier. Each intensity meter includes two pulse counters with analog converters producing histograms of the pulse rate by alternating count and readout in successive cycles. Individual pulses can be extracted for display on the screen of an S8-9A storage oscillograph. Included are also a KSP-4 automatic recording instrument and a ChZ-34 frequency meter. The counters have capacities of 100, 1000, and 10,000 pulses with the count and storage time 3, 10, and 30 s, respectively. All components are built with semiconductor devices and integrated-circuit chips. Author

N86-25631# Joint Publications Research Service, Arlington, Va.
SYNCHRONIZATION SYSTEM FOR PULSED POWER LASER WITH OPTOELECTRONIC CONTROL Abstract Only **c35**
V. V. Appolonov, S. I. Ziyenko, V. V. Brytkov, S. V. Muravyev, and V. A. Yamshchikov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 78 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 163-168 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A synchronization channel was built for pulsed power lasers with optoelectronic control. It consists of a transmitter and a receiver connected through a 5 m long fiber-optic cable, each in a separate shielded housing, and a high-voltage nanosecond pulse shaper followed by an electro-optic modulator behind the receiver. The transmitter contains a photodiode at the input on which synchronizing pulses impinge, a delay line followed by a shaper of current pulses consisting of an avalanche transistor with an emitter triggering circuit, and a semiconductor-type injection laser with reverse bias at the output. The receiver contains an input photodiode and two-stage output amplifier; the latter has negative feedback in parallel and an emitter follower behind. The shaper of high-voltage nanosecond pulses includes an autonomous power supply and a kratron output commutator. The hardware between this commutator and the electrooptic modulator includes two transformers with toroidal ferrite cores, two shaping coaxial lines, and two nonlinear-inductance coils. The modulator consists of two electrooptical crystals. The synchronizing channel is used

for control of a transverse-excitation atmospheric-pressure CO2-laser operating in the repeater mode. Author

N86-25632# Joint Publications Research Service, Arlington, Va.
APPARATUS WITH TRANSPARENT ANVILS-WINDOWS FOR OPTICAL AND X-RAY ANALYSIS UNDER HIGH PRESSURE Abstract Only **c36**
B. A. Fursenko, O. V. Kholdeyev, Yu. A. Litvin, and V. D. Kropachev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 80-81 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 174-178 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

An apparatus for optical and X-ray analysis of minerals has been built consisting of a kinematic plunger mechanism and a force mechanism. The latter produces a force which moves the plunger with self-alignment through a long cylinder without loss of parallelism between the active surfaces. The force is produced by a power screw and is transmitted through a lever mechanism of the second kind consisting of a standing lever and a movable one. A metal gasket around a ruby-crystal pressure transducer between diamond or bromellite anvils at the tips of both levers is hinge-coupled to each. All three hinge axes being mutually orthogonal for maximum freedom of self-alignment for the force mechanism. All pressure bearing components are made of high strength steel. The apparatus was tested with diamond anvils for pressures above 30.0 GPa. Author

N86-25633# Joint Publications Research Service, Arlington, Va.
DIAMOND CHAMBER TO STUDY EFFECT OF SHEARING STRAIN ON STRUCTURES AND PROPERTIES OF SOLIDS UNDER PRESSURES UP TO 43 GPa Abstract Only **c35**
V. D. Blank, Yu. S. Konyayev, A. I. Kuznetsov, and E. I. Estrin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 81 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 178-180 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A test chamber was built to study solids under high pressure and shearing strain. The anvils are made of natural diamond single crystals or synthetic cabonado diamonds. A specimen is placed between the two anvils, usually without a gasket, after the latter have been adjusted by means of a ball hinge into plane parallelism. Pressure is produced by applying a force of up to 15 kN to the plunger through a lever mechanism. Shear is produced by turning one anvil 5 to 8 deg with a motor through a speed reducer, at a rate which can be varied from 0.1 to 8.8 deg/min, without significant loss of parallelism with the fixed other anvil. Optical examination and measurements as well as photographic recording are made under a MIN-8 microscope. With natural diamonds used for the anvils, the pressure could be calibrated against the luminescence spectrum of a ruby crystal. The chamber was tested on NaCl+ Al203:(1 vol.%)Cr(3+) under pressures up to 43 GPa before and after shear through a 20 deg. angle, without damaging the diamond anvils. The chamber was also used for X-ray examination of bismuth and germanium, namely for determining the pressure dependence of their electrical resistivity and for recording their phase transitions. Author

N86-25634# Joint Publications Research Service, Arlington, Va.
WIDEBAND PIEZOELECTRIC PRESSURE TRANSDUCER Abstract Only **c35**
V. A. Godonyuk, B. V. Zhuravlev, and I. P. Shedko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 83 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 214-217 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A piezoelectric pressure transducer for pressures of up to 100 MPa was developed, with an operating frequency range from 100 Hz to 1 MHz on the electrical side - sufficiently wide to reproduce pressure profiles of arc discharges with microsecond rise times and millisecond fall times. The sensing element is a disk of TsTS-19 piezoceramic material, 1 mm thick and 5 mm in diameter. It is thermally and electrically insulated from the arc plasma by a compound transmission rod consisting of two quartz crystals 5 mm in diameter and freely sliding inside a teflon sleeve. The 50 mm long waveguide for absorbing acoustic vibrations and thus separating the valid signal from the reflected one consists of brass wires acoustically insulated with epoxy resin and encapsulated into a textolite sleeve with epoxy resin at the other end. A copper housing shields the transducer from electromagnetic interference. The transducer output signal passes through a matching circuit and then a high-impedance voltage divider to a differential amplifier, the latter being shunted by a stabilizing low 1 Mohm resistance at the input. A special feature of this transducer is low-frequency compensation by means of a corrective RC-circuit. After calibration of oscillograms, the transducer has a sensitivity of 1 V/MPa over the 10(-2) to 10 MPa range. Its resolution corresponds to the 2 microsecond maximum rise time of its output signal, with the sensing element located at the end of a shock tube. Author

N86-25635# Joint Publications Research Service, Arlington, Va.
FURNACE FOR TESTING MATERIALS IN AIR AT TEMPERATURES UP TO 1850 DEG C Abstract Only **c35**
V. Ye. Sotnikov, A. M. Smirnitskiy, A. V. Satanovskiy, V. L. Balkevich, and Yu. M. Mosin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 84 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 217-218 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A tubular high-temperature air furnace with a La2(CrO3)3 heater element was developed for testing materials. The electrical resistance of this heater element is 200 ohm at 20 C room temperature and 20 to 30 ohms at the top temperature. The helical heater is surrounded by three cylindrical layers of refractory thermally insulating materials within a cylindrical metal enclusure: a layer of high-density corundum on the inside and a layer of ShLB-0.4 fireclay on the outside with a layer of KL-1.3 plain corundum in between. The heater is energized from a 220 V - 50Hz power line through a thyristor bank. The furnace temperature is controlled by a high-precision regulator around the heater extension above the lining, with a PR(Pt-Rh) 30/6 thermocouple mounted preferably inside rather than outside the heater coil for faster response and better accuracy. The test tube with a specimen is inserted inside the heater coil, where it can remain for more than 50 h at 1850 C and for short periods at 1900 C. The furnace can be cycled at least 50 times in a row by heating at a rate of 20 C/min and then cooling to 20 C. Refractory materials can be tested in this furnace also with air replaced by an oxidizing atmosphere. Author

N86-25636# Joint Publications Research Service, Arlington, Va.
DETECTION OF CHARGED-PARTICLE PLUGS IN GASEOUS TARGET BY MEANS OF SEMI-CONDUCTOR-TYPE DETECTORS Abstract Only **c35**
G. F. Binko, M. G. Gornov, Yu. P. Dobretsov, -Ugryumov Kirillov, V. G., A. A. Maloletnev, A. L. Mikaelyan, A. P. Pichugin, V. P. Protasov, V. I. Savelyev, A. Ya. Smakov et al *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 86 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 36-40 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A reliable method of detecting charged-particle plugs in a gaseous space is proposed which, unlike the conventional anticoincidence method using scintillation detectors, involves measuring the energy of impinging particles with two semiconductor-type detectors. Only particles with an energy so low that they will stop in the target are sampled. This method eliminates background interference caused by plugs in scintillators and is applicable to fast processes as well as slow ones. The technique was proved in an experiment with muons in a synchrocyclotron. The gaseous target was a Ne(+) 2.5% Xe mixture, the xenon forming an electron shell of muonic fluorine. A beam of muonic

atoms in Ne and Fe, formed by two magnetic lenses, was passed through a collimator between two monitoring scintillation counters and then through two graphite moderators into the gas chamber with two semiconductor-type detectors: a Si(Au) surface-barrier detector and a Si(Li) lithium-drift detector. The target together with three pairs of scintillation control detectors of an electron telescope, each pair with an aluminum filter-interlayer, were placed inside a set of Helmholtz coils producing a magnetic field. Author

N86-25637# Joint Publications Research Service, Arlington, Va.
ANALYSIS OF FREQUENCY CHARACTERISTICS OF MULTILAYER CYLINDRICAL SHELLS ON BASIS OF VARIOUS THEORIES Abstract Only **c75**
Y. M. Griorenko, Ye. I. Bespalova, and T. N. Kilina *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 87 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1984 p 52-58 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

Free undamped vibrations of multilayer circular cylindrical shells are analyzed according to an exact three-dimensional theory of elasticity and according to two approximate two-dimensional theories, namely the Kirchhoff-Love classical theory and the Timoshenko nonclassical theory. It is assumed that such a shell consists of an arbitrary number of layers in rigid contact with one another and each having a uniform thickness. The problem reduces to a system of partial differential equations the nontrivial solution to which yields the modes and the frequency spectrum of free vibrations as well as their dependence on the relative thickness of the load-bearing layers. The nonclassicial theory is found to agree better with the exact theory than does the classical theory. Numerical data on a typical example of an orthotropic triple-layer shell reveal mode sign reversals and low frequency dips at certain ratios of carrier thickness to filler thickness. Author

N86-25638# Joint Publications Research Service, Arlington, Va.
REPRESENTATION OF MEDIAN SHELL SURFACES BY MONGE SURFACES Abstract Only **c39**
Ya. G. Savula *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 87-88 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1984 p 70-75 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

Parametrization of median shell surfaces by representing them as Monge surfaces is proposed; a Monge surface is formed by a planar generatrix curve which moves along a generally spatial directrix curve while it remains fixed in the plane normal to the latter. The simple case of a smooth generatrix is considered, assuming moreover a planar directrix. Shallow surfaces are described on this basis; a typical example is a surface of revolution with a circular parallel as directrix and a meridian as generatrix. A parametrization procedure is shown which simplifies the expressions for Lame coefficients and principal curvatures. Calculations are based on the Menier theorem and use of grids of biquadratic elements. Author

N86-25639# Joint Publications Research Service, Arlington, Va.
SPECIAL REVERSE PROBLEM FOR CYLINDRICAL SHELL OF VARIABLE THICKNESS Abstract Only **c39**
N. P. Totskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 88 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1984 p 75-80 Original language document was announced in IAA A85-24022 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

The reverse state-of-stress and deflection problem of optimization is considered for a cylindrical shell of variable thickness under an axisymmetric load, with the thickness distribution as the control function under geometrical constaints and with strength as the design criterion. The formulation of this problem is to determine the longitudinal thickness profile with which the deflection function will be the closest uniform approximation of the prescribed deflection curve. The problem is treated as an infinite-dimensional one and, accordingly, replaced with an approximating sequence of problems in nonlinear programming. The latter is solved by finding the thickness vector rather than the thickness function and constructing with it a piecewise-linear continuous control. This has been done for an isotropic cylindrical shell under uniform external pressure with rigidly clamped or hinge supported ends, and the thickness profile is found which minimizes the deflection function. Comparison with a shell of uniform thickness and the same weight indicates that the latter is only slightly suboptimum in this respect. Author

N86-25640# Joint Publications Research Service, Arlington, Va.
WAVE PROCESSES DURING FLEXURAL VIBRATIONS OF BEAMS UNDER DEFORMATION Abstract Only **c39**
K. P. Dynnik *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 88-89 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1984 p 95-100 Original language document announced in IAA as A85-24023 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

The flexural vibrations of damped bars are treated as a superposition of traveling waves of deformation. The complex phase velocity of the waves is interpreted in mechanical terms, and expressions are obtained for the amplitudes of incident and reflected waves at the ends of the bar. The contribution of each wave to the general vibration mode is determined, as is the wave impedance. V.L.

N86-25641# Joint Publications Research Service, Arlington, Va.
STABILITY OF SHELLS OF REVOLUTION WITH SMALL DEVIATIONS FROM CYLINDRICAL SHAPE Abstract Only **c39**
D. V. Babich and L. A. Deriglazova *In its* USSR Report: Engineering and Equipments (JPRS-UEQ-86-002) 7 Feb. 1986 p 90 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1984 p 106-108 Original language document was announced in IAA as A85-24024 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

The effect of initial geometrical imperfections on the critical buckling load is investigated by using an approach where the shell imperfections are expressed through the geometrical parameters of the middle surface, such as curvature and Lame coefficients. The stability problem for shells with an arbitrary shape of the generatrix is solved using a variational-difference method. In particular, the variational principle is combined with the method of discrete functional approximation to obtain a stable rapidly converging numerical algorithm for calculating critical loads. V.L.

N86-25642# Joint Publications Research Service, Arlington, Va.
NATURAL VIBRATION MODES OF IMPERFECT CONICAL SHELLS Abstract Only **c39**
S. Yu. Fialko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 90-91 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1984 p 109-112 Original language document was announced in IAA as A85-24025 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

The natural vibrations of a thin circular shell in the shape of a truncated cone with a slight nonaxisymmetric initial imperfection were analyzed. Linear (with respect to the perturbed state components) equations, derived from geometrically nonlinear Mushtari-Vlasov equations through linearization, are used as the resolvent equations. The problem is solved using the finite-difference method. It is shown that the initial imperfection sometimes gives rise to vibrational modes with different numbers of nodal lines near the larger and the smaller ends of the shell. V.L.

N86-25643# Joint Publications Research Service, Arlington, Va.
NONAXISYMMETRIC DEFORMATION OF FLEXIBLE TOROIDAL SHELL WITH ELLIPTIC CROSS-SECTION Abstract Only **c39**
V. S. Demyanchuk *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 91-92 Transl. into ENGLISH

from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1986 p 112-115 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

Nonaxisymmetric deformation of a flexible thin toroidal shell with elliptic cross section by a surface load is analyzed, allowing the shell thickness to vary generally in two coordinate directions. The corresponding boundary value problem is formulated in the quadratic approximation of the geometrically nonlinear theory. The resulting system of nonlinear partial differential equations with variable coefficients and with the meridional arc length as an integration variable is solved by the method of straight lines, assuming that the resolvent functions and the variation of coefficients are sufficiently smooth around the circumference. A numerical solution is obtained by the stable method of discrete orthogonalization according to the Runge-Kutta scheme so as to avoid local instabilities, and using the algorithm of linear integration so as to operate with a constant data volume rather than with a successively doubling one. The procedure was programmed in FORTRAN for YeS computers and a BESM-6. Author

N86-25644# Joint Publications Research Service, Arlington, Va.
PARAMETRIC OPTIMIZATION OF PLASTIC CYLINDRICAL SHELLS WITH GEOMETRICAL NON-LINEARITY Abstract Only **c39**
Ya. A. Lellep *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 93 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 1, Jan.-Feb. 1985 p 138-146 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

Design optimization of a closed circular cylindrical shell under internal pressure is considered; its ideally triple-layer lateral wall consists of two sheaths separated by a filler and its ends are arbitrarily constrained. Both the length of the shell and its total wall thickness are fixed. The problem is to optimally space additional reinforcing hoops along the wall and to match the allowable pressure range with the thickness of both sheaths so as to minimize the functional which characterizes the optimality criterion. The shell is assumed to be a Trask-St. Venant body of rigid plastic material, which adds two other constraints in accordance with the corresponding geometrically nonlinear theory of plasticity. The analysis and calculations are based on the corresponding strain theory of plasticity, where the yield surface forms a closed polyhedron and can be described by the equation of a plane in the space of generalized stresses. The problem is formulated as a variational one of optimal control with phase constraints. Author

N86-25645# Joint Publications Research Service, Arlington, Va.
PRECESSION OF NATURAL VIBRATION MODE IN SPHERICAL SHELL DURING ROTATION Abstract Only **c39**
V. F. Zhuravlev and A. L. Popov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 94 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 147-151 Original language document announced in IAA as A85-28909 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A hemispherical shell with a free edge is considered when rotating about its axis of symmetry at a generally variable speed. The vibrations of such a shell are described by the V.V. Novozhilov system of three resolvent equations. These are reduced to two systems of ordinary differential eqautions for the amplitudes of vibrations, both containing the relative speeds of traveling natural circumferential modes and only one containing their frequencies. The quadratic characteristic equation has only one positive root, which yields the precession speed of a natural mode of plane-flexural or torsional vibrations. Calculations for the fundamental mode reveal that its speed is only slightly dependent on the Poisson ratio of the shell material. The ratio of mode speed to shell speed is completely independent of the shell speed, which means that the mode axis does not depart from its position relative to certain points on the shell equator as the shell speed varies, provided that the shell speed remains far below the critical. The analysis for the special case of constant low speed of shell rotation is extended to the general case of an arbitrarily variable speed.
Author

N86-25646# Joint Publications Research Service, Arlington, Va.
NATURAL VIBRATIONS OF CYLINDRICAL SHELL UNDER INITIAL EXTERNAL PRESSURE NONUNIFORMLY DISTRIBUTED OVER CIRCUMFERENCE Abstract Only **c39**
S. N. Kukudzhanov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 95-96 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 10, Oct. 1984 p 53-59 Original language document was announced in IAA as A85-16161 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

Natural radial vibrations of a cantilever cylindrical shell are analyzed, specifically a shell which is hinge-supported at one end and reinforced by a perfectly stiff ring at the free other end. The object is to determine the effect of initial external pressure, a pressure nonuniformly distributed over the circumference, on the resonance modes and frequencies. The initial external pressure is assumed to be an even function of an angular cylindrical coordinate, and the deflection is sought in the form of a double series. The problem is solved by the Bubnov-Galerkin method, with the indices of the coordinate functions sought for the optimum initial approximations not a priori fixed but forming some not a priori known sequence. M.G.

N86-25647# Joint Publications Research Service, Arlington, Va.
STABILITY OF MULTILAYER CYLINDRICAL SHELL UNDER EXTERNAL PRESSURE Abstract Only **c39**
A. N. Anidreyev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 96-97 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 10, Oct. 1984 p 59-64 Original language document was announced in IAA as A85-16162 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

A comparison is made between critical stresses for a layered cylindrical shell loaded by a uniform external pressure, as determined from different versions of improved stability theories allowing for transverse shear and transverse elongation. The effects of transverse shear, normal reduction, and subcritical state inhomogeneity on the critical load are examined parametrically.
V.L.

N86-25648# Joint Publications Research Service, Arlington, Va.
CYLINDRICAL SHELL WITH SLIT UNDER TENSION Abstract Only **c39**
M. Sh. Dyshel *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 97 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 10, Oct. 1984 p 64-69 Original language document was announced in IAA as A85-16163 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

Thin cylindrical shells made of AMg6M aluminum alloy with a narrow circumferential slit were tested in a TsD-10/90 tensile machine, with no load acting on the edges of the 0.2 mm wide slit. Normal deflections in the vicinity of the slit were measured with pneumatic strain gauges. The stress-strain curves for shells 120 mm in diameter and 0.3 to 0.46 mm thick with slits 20 to 70 mm long reveal a typical linear dependence of deflection on applied tension over a wide initial load range. The deflection is larger when the slit is longer, and when the shell is thinner, it is larger than the shell thickness even below the yield point. The deflection is maximum at the center of the slit; the shell buckles outward along the edges of the slit, decreases toward the tips of the slit and the shell buckles inward along the unslit portion of the circumference. Loading beyond the linear range results in cracking beyond the tips of the slit in the same direction, up to complete fracture around the circle. The cracking and fracture kinetics in shells of 70 to 250 m diameters under monotonically increasing tension, monitored with photoresistors and by high-speed photogra-

phy, reveal a long phase of steady subcritical crack propagation at a constant rate after an initial noncracking range and followed by supercritical avalanche breakdown. For quantitative analysis of this process, the dependence of the length of a crack on the length of time was approximated as a piecewise-linear function.
Author

N86-25649# Joint Publications Research Service, Arlington, Va.
AXISYMMETRIC CONTACT INTERACTION OF CYLINDRICAL SHELL AND ELASTIC ON RIGID HOUSING Abstract Only
c39
W. Krzys and A. Moc *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 101 Transl. into ENGLISH from Problemy Prochnosti (Kiev, USSR), no. 1, Jan. 1985 p 90-96 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

An engineering problem in the design and operation of hydraulic presses, namely axisymmetric contact interaction of a cylindrical shell and its housing, is analyzed by the method of variational inequalities with finite differences. The corresponding differential equations are formulated in accordance with the applicable small-strain Timoshenko theory of shells. The shell is in an either elastic or rigid housing longer than the shell on both sides, under a radial load continuously distributed over the middle zone and discretely concentrated but dense toward the ends. The very ends of the shell are assumed to be free of constraints. The results of the solution indicate that the maximum shell deflection and the widths of the contact zones depend on the stiffness of the housing, and that increasing the stiffness narrows the contact zones as well as decreases the maximum shell deflection. A rigid housing corresponds to one with infinite stiffness, and an elastic one is found to approach this case, a free shell without constraint in a housing with zero stiffness representing the far other extreme case.
Author

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N86-25650*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NEAR-FIELD SPILLOVER FROM A SUBREFLECTOR: THEORY AND EXPERIMENT
S. W. Lee (Illinois Univ., Urbana-Champaign), R. Acosta, A. R. Cherrette, and P. T. Lam (Lockheed Missiles and Space Co., Sunnyvale, Calif.) May 1986 32 p refs
(Grant NAG3-419)
(NASA-TM-88763; NAS 1.15:88763; ELR-86-5; UILU-ENG-86-2547) Avail: NTIS HC A03/MF A01 CSCL 20N

In a dual reflector antenna, the spillover from the subreflector is important in determining the accuracy of near-field measurements. This is especially so when some of the feed elements are placed far away from the focus. A high-frequency GTD analysis of the spillover field over a plane just behind the subreflector is presented. Special attention is given to the field near the incident shadow boundary and the role played by the slope diffraction term. Computations are in excellent agreement with experimental results.
Author

N86-25651# Sandia National Labs., Albuquerque, N. Mex.
LATERAL WAVE PROPAGATION IN THE PRESENCE OF A CONDUCTING PLATE
J. M. Dunn May 1985 52 p refs
(Contract DE-AC04-76DP-00789)
(DE86-004974; SAND-85-0373) Avail: NTIS HC A04/MF A01

Lateral waves can propagate when an antenna is placed close to an interface between two different media. A study is made of how the lateral wave is affected by a conducting plate placed parallel to the interface. This changes the type of decay of the wave along the interface from that of algebraic to exponential. A new method is used in developing the formulas. Impedance boundary conditions are used to decouple the two media at each step of an iterative procedure. Single medium techniques can then be used in each region. The formulas are seen to agree well with numerical results from the exact integral representations of the fields.
DOE

N86-25652# Royal Signals and Radar Establishment, Malvern (England).
A SYSTEM DYNAMICS MODEL FOR COMMUNICATIONS NETWORKS
A. J. Awcock and T. E. G. King Sep. 1985 26 p refs
(AD-A163748; RSRE-MEMO-3866; DRIC-BR-97971) Avail: NTIS HC A03/MF A01 CSCL 17/2

An abstract model of a communications network in system dynamics terminology is developed as implementation of this model by a FORTRAN program package developed at RSRE is discussed. The result of this work is a high-level simulation package in which the performance of adaptive routing algorithms and other network controls may be assessed for a network of arbitrary topology.
GRA

N86-25653# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE DEVELOPMENT OF THE AFIT COMMUNICATIONS LABORATORY AND EXPERIMENTS FOR COMMUNICATIONS STUDENTS M.S. Thesis
Jerome B. Thompson Dec. 1985 303 p refs
(AD-A163948; AFIT/GE/ENG/85D-48) Avail: NTIS HC A14/MF A01 CSCL 05/9

This thesis was a development of a series of experiments for an electronics communications laboratory. These experiments were designed to reinforce theoretical courses offered in the Air Force Institute of Technology Electrical Engineering Core Communications Sequence in the form of demonstrations or laboratory exercises. The experiments were developed under the criteria of investigating a significant number of analog and digital communication system concepts with a minimum amount of experimentation time. Extensive use of a spectrum analyzer was included in many of the experiments. The topics covered in the experiments include: amplitude modulation; frequency modulation; balanced modulator; single sideband modulation; phase-lock loop and frequency synthesizer; pulse amplitude modulation; pulse code modulation; delta modulation; amplitude shift keying; phase shift keying; and frequency shift keying. The results of this study indicated that many more system concepts could be included in laboratory exercises, such as spread spectrum communications time and frequency division multiplexing, and computer oriented testing and analysis.
GRA

N86-25654# Drexel Univ., Philadelphia, Pa.
ELECTROMAGNETIC SCATTERING PROPERTIES OF FINITE CYLINDERS AND SPHEROIDS Contractor Report, Jun. 1981 - Aug. 1984
Leonard D. Cohen, Richard D. Haracz, and Ariel Cohen Nov. 1985 33 p
(Contract DAAK11-81-K-0003; DA Proj. 1L1-61102-A-71-A)
(AD-A163034; CRDC-CR-85041) Avail: NTIS HC A03/MF A01 CSCL 20/14

The perturbation theory suggested by Shifrin is applied through the second order to the scattering of light from dielectric spheroids and finite cylinders. Double scattering events involving long cylindrical particles are discussed. Comparisons between experimental and theoretical scattering from long brass and copper cylinders are discussed also.
GRA

N86-25655# Operations Research, Inc., Rockville, Md.
SIR-B (SHUTTLE IMAGING RADAR) IMAGES
31 May 1985 8 p
(Contract N00014-84-C-0716)

(AD-A163012) Avail: NTIS HC A02/MF A01 CSCL 17/2

Space Shuttle Mission 41G was launched from Kennedy Space Center on 5 October 1984. Aboard the instrument pallet was the 1.28 GHz (L-band) Shuttle Imaging Radar (SIR-B) intended to obtain SAR images for geology, agriculture, forestry, hydrology, and ocean sciences. Data were intended to be transmitted to earth via a Ku band communication link with the Tracking and Data Relay Satellite (TDRS). Unfortunately, the shuttle's trainable Ku communication antenna failed to lock onto the TDRS, making high rate data transmission impossible. A real-time-revised observation program, of much smaller scale than the original plan, was substituted making use of an onboard tape recorder. The flight crew recorded radar data on the recorder and then reoriented the shuttle itself, with the Ku antenna fixed, to point to TDRS and transmit the data. The revised plan eliminated about 80 percent of the planned data swaths and shortened the remainder. A number of errors crept into the SIR-B experiments as a result of the sudden and complete reprogramming as well as a problem in latching the radar antenna. Finally, an electrical problem in the radar caused an 8-10 dB reduction in signal-to-noise ratio. Author (GRA)

N86-25656# Ohio State Univ., Columbus. ElectroScience Lab.
GROUND VEHICLE CLASSIFICATION USING MULTIFREQUENCY MULTIPOLARIZATION RESONANCE RADAR Progress Report
Neil Chamberlain Jul. 1985 156 p
(Contract N00014-82-K-0037)
(AD-A163026; ESL-714190-10) Avail: NTIS HC A08/MF A01 CSCL 17/9

Experiments investigating the classification of ground vehicles using processed radar returns are described. The calibrated and scaled backscatter measurements of scale-model vehicles at several azimuth angles are used to establish a catalog representing the VHF resonance region radar returns of actual vehicle targets. The performance of both the nearest neighbor algorithm, (using frequency domain data), and a correlation algorithm (using time domain data), is investigated. The effects of wave polarization, azimuth angle, and other key parameters are examined. The consequences of introducing forced errors into the estimates of aspect angle are studied. A novel feature set employing the ratio of vertically and horizontally polarized radar returns is described, and its classification performance is examined. In general, classification is found to be very much dependent on the particular algorithm, azimuth angle and polarization of interest. The Nearest Neighbor algorithm, using Radar Cross Section Amplitudes as features, was found to perform quite well, yielding classification rates of about 90%, depending on target azimuthal angle and wave polarization. Increasing the number of classification frequencies improves performance, but only to a limit. Errors in aspect angle are found to significantly degrade classification performance. GRA

N86-25657# E-Systems, Inc., Fairfax, Va.
ON ACHIEVING NETWORK LPI (LINK PARAMETER INTERACTIONS) FOR SPREAD SPECTRUM COMMUNICATIONS Final Report, May 1984 - May 1985
William J. OBrien, Jeffrey Seibert, Brian Vogel, and Patricia W. Young Oct. 1985 246 p refs
(Contract DAAG29-84-C-0008)
(AD-A163985; ARO-21611.3-EL) Avail: NTIS HC A11/MF A01 CSCL 17/2

This report investigates and recommends methods of adaptively controlling parameters of Spread Spectrum Communication links to achieve Low-Probability-of-Intercept for a network composed of many links. The results provide an informative insight into the interaction between link/network variables. The best choice of parameter values for optimization of tactical situations for the communicators and/or the interceptor may be made based on algorithms developed. Recommendations for further research are included. Author (GRA)

N86-25658# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A KNOWLEDGE BASED SYSTEM FOR THE DESIGN OF MOBILE SUBSCRIBER EQUIPMENT COMMUNICATIONS NETWORKS M.S. Thesis
Brin A. Tolliffe Dec. 1985 150 p refs
(AD-A163994; AFIT/GCS/ENG/85D-16) Avail: NTIS HC A07/MF A01 CSCL 17/2

This project designed a knowledge based system that will assist tactical communications systems planners design tactical communications networks. The system was developed to be used with a new generation of United States Army tactical communications equipment, the Mobile Subscriber Equipment (MSE) System, and was named the Mobile Subscriber Equipment Network Design System (MSENDS). MSENDS is designed to use terrain knowledge available from digital terrain databases, and knowledge specific to the MSE system to perform the network design process. The heuristic network design method of clustering is used to develop an initial terrain independent network design. The initial design is then evaluated using terrain knowledge and MSE specific knowledge for constraint satisfaction. Network redesign strategies are invoked as unsatisfied constraints are identified. The evaluation and redesign of the network is performed iteratively until a satisfactory design is achieved. A prototype of MSENDS was implemented to evaluate the proposed design. A blackboard architecture that enabled non-chronological backtracking to be used was implemented. The prototype does not use terrain knowledge in its design or redesign operations; only MSE specific knowledge is used by the prototype. It was found that the use of the design, evaluate redesign architecture coupled with MSE specific knowledge was able to design a network with a lower cost than was produced by a system employing no domain specific knowledge. These results indicate that the proposed system may be useful in the design of tactical communications networks. GRA

N86-25659# Indiana Univ., Bloomington. Dept. of Psychology.
MULTI-USER REAL-TIME SPEECH PROCESSING FACILITY Final Report, 1 Jun. 1983 - 31 Aug. 1984
David B. Pisoni 21 Mar. 1985 12 p refs
(Grant AF-AFOSR-0218-83)
(AD-A164005; AFOSR-86-0005TR) Avail: NTIS HC A02/MF A01 CSCL 17/2

Research projects requiring the VAX 11/750 and related peripherals have all focused on speech analysis, perception and recognition. We compared perceptual confusions occurring for natural and synthetic speech syllables which showed that synthetic speech is not equivalent to noisy or degraded natural speech. We conducted a study that indicated that perception of synthetic speech is improved by training. Training with fluent synthetic sentences improves performance for both isolated words and sentences. Training with isolated words improves performance on isolated words but does not improve performance on fluent synthetic sentences. A large-scale series of experiments investigated the effects of noise in a talker's ears on speech production. Words produced in noise are longer, louder and higher in pitch than words produced in the quiet. The tilt of the power spectrum decreased and formant frequencies shifted in noise. nition, I/O, human factors, cognitive processes, and communication sciences. GRA

N86-25660# California Inst. of Tech., Pasadena. Div. of Engineering and Applied Science.
APPROXIMATION TECHNIQUES FOR PLANAR PERIODIC STRUCTURES
Richard C. Compton and David B. Rutledge Oct. 1985 7 p refs
(Contract DAAG29-82-K-0165)
(AD-A164053; ARO-19483.20-EL) Avail: NTIS HC A02/MF A01 CSCL 20/3

The rigorous calculation of electromagnetic properties of periodic meshes using moment methods requires considerable algebraic work and computer resources. In this paper a number of easy to use approximation techniques for analyzing thin structures with square, rectangular and circular holes are presented. Formulas for the effective impedance of these meshes are described which can easily take into account oblique incidence

and the presence of a dielectric substrate. In addition techniques for analyzing more complex shaped apertures such as a cross are discussed. These methods are more accurate than existing approximation techniques and can be applied to a wide range of situations that could not be handled before. GRA

N86-25661# California Inst. of Tech., Pasadena.
IMAGING ANTENNA ARRAYS Final Report, 1 Aug. 1982 - 30 Sep. 1985
David Rutledge Dec. 1985 6 p refs
(Contract DAAG29-82-K-0165)
(AD-A164055; ARO-19483.21-EL) Avail: NTIS HC A02/MF A01 CSCL 17/9

The goal of the research contract has been to develop monolithic imaging antenna arrays for millimeter waves. This has required new developments in planar antennas for integrated-circuit substrates that are suitable for integration with planar Schottky diodes. In the future, this work should lead to a monolithic millimeter-wave TV camera. GRA

N86-25662# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
PREDICTION OF POWER MARGINS ON SATELLITE COMMUNICATIONS LINKS AS A FUNCTION OF LOCAL RAIN RATE STATISTICS AND DESIRED AVAILABILITY M.S. Thesis
Michael J. Navas Dec. 1985 161 p refs
(AD-A164097; AFIT/GE/ENG/85D-29) Avail: NTIS HC A08/MF A01 CSCL 17/2

This thesis presents an algorithm which can be used to predict power margins needed to overcome the degrading effects of rain on satellite communication links in the 7 to 9 GHz frequency range. This algorithm employs established mathematical models which are used to characterize rain rate behavior and its effects on wave propagation. The algorithm accounts for each of the three ways in which the link can be degraded by rain; signal attenuation, signal depolarization, and increased noise power at the receiver input. This algorithm is designed to give the link designer all the tools necessary to compute a reliable power margin. The power margin is tailor-made for each individual link by considering all the relevant variables that can distinguish one link from another including the specified value of link availability, the rain rate characteristics at the location of the satellite Earth terminal, and the link configuration. Finally, the algorithm is implemented in a computer program to make it convenient to use. Author (GRA)

N86-25663# Electronic Design Associates, Costa Mesa, Calif.
AUTOMATED RECOGNITION OF HELIUM SPEECH. PHASE I: INVESTIGATION OF MICROPROCESSOR BASED ANALYSIS/SYNTHESIS SYSTEM Final Report
Howard J. Jelinek 31 Jan. 1986 33 p
(Contract N00014-85-C-0593)
(AD-A164113) Avail: NTIS HC A03/MF A01 CSCL 09/2

This is the Final Report of Electronic Design Associates on its Phase I SBIR project. The purpose of this project is to develop a method for correcting helium speech, as experienced in diver-surface communication. The goal of the Phase I study was to design, prototype, and evaluate a real time helium speech corrector system based upon digital signal processing techniques. The general approach was to develop hardware (an IBM PC board) to digitize helium speech and software (a LAMBDA computer based simulation) to translate the speech. As planned in the study proposal, this initial prototype may now be used to assess expected performance from a self contained real time system which uses an identical algorithm. The Final Report details the work carried out to produce the prototype system. Four major project tasks were: a signal processing scheme for converting helium speech to normal sounding speech was generated. The signal processing scheme was simulated on a general purpose (LAMDA) computer. Actual helium speech was supplied to the simulation and the converted speech was generated. An IBM-PC based 14 bit data Input/Output board was designed and built. A bibliography of references on speech processing was generated. GRA

N86-25664# Naval Postgraduate School, Monterey, Calif.
REDUCTION IN BANDWIDTH BY USING VARIABLE LENGTH CODES M.S. Thesis
Serdar Akinsel Dec. 1985 113 p refs
(AD-A164356) Avail: NTIS HC A06/MF A01 CSCL 09/4

A method of coding an ensemble of messages of a finite number of symbols is developed. Minimizing the average number of coding digits per message by using Huffman coding can result in a large variance. This is a problem because a large variance requires a large buffer and also creates more time delay during transmission and decoding respectively for on-line communication. This research examines modified Huffman codes for the purpose of finding a way to reduce the variance. The effective parameters which give the lower variance modified Huffman codes are obtained. The buffer requirements and the reduction of the bandwidth to forward messages in an on-line communication is investigated. A possible design for a practical system is presented for using the modified Huffman codes. GRA

N86-25665# Naval Research Lab., Washington, D. C.
THE EFFECT OF LPC (LINEAR PREDICTIVE CODING) PROCESSING ON THE RECOGNITION OF UNFAMILIAR SPEAKERS Interim Report
Astrid Schmidt-Nielsen and Karen R. Stern 20 Sep. 1985 14 p refs
(AD-A164461; NRL-8926) Avail: NTIS HC A02/MF A01 CSCL 17/2

The effect of narrowband digital processing, using a linear predictive coding (LPC) algorithm at 2400 bits/s, on the recognition of previously unfamiliar speakers was investigated. Three sets of five speakers each (two sets of males differing in rated voice distinctiveness and one set of females) were tested for speaker recognition in two separate experiments using a familiarization-test procedure. In the first experiment three groups of listeners each heard a single set of speakers in both voice processing conditions, and in the second two groups of listeners each heard all three sets of speakers in a single voice processing condition. There were significant differences among speaker sets both with and without LPC processing, with the low distinctive males generally more poorly recognized than the other groups. There was also an interaction of speaker set and voice processing condition; the low distinctive males were no less recognizable over LPC than they were unprocessed, and one speaker in particular was actually better recognized over LPC. Although it seems that on the whole LPC processing reduces speaker recognition, the reverse may be the case for some speakers in some contexts. This suggests that one should be cautious about comparing speaker recognition for different voi ce systems of the basis of a single set of speakers. It also presents a serious obstacle to the development of a reliable standardized test of speaker recognizability. GRA

N86-25666# Connecticut Univ., Storrs. Dept. of Electrical Engineering and Computer Science.
COLLISION RESOLUTION ALGORITHMS FOR SPREAD SPECTRUM ENVIRONMENTS
Michael Paterakis and P. Papantoni-Kazakos Jan. 1986 42 p refs
(AD-A164469; UCT/DEECS/TR-86-2) Avail: NTIS HC A03/MF A01 CSCL 17/2

In some spread spectrum environments, the low energy of the transmitted signals, in conjuction with the existence of channel noise, doesn't allow the distinction between collision and lack of transmissions. For such environments, and for the Poisson user model, the authors propose and analyze stable full feedback sensing and limited feedback sensing synchronous transmission algorithms. They assume binary SNS (success versus nonsuccess) feedback per slot, and the possibility of transmission of phony data by a central node. The highest throughput attained by both the full feedback sensing and the limited feedback sensing algorithms is 0.322, while the latter induces somewhat higher delays. This is compensated by the robustness of the limited feedback sensing algorithm in the presence of feedback errors (in

contrast to the full feedback sensing algorithm) and its modest requirements on the sensed feedback history. Author (GRA)

N86-25667# Axiomatix, Los Angeles, Calif.
ADVANCED LPI (LOW-PROBABILITY-OF-INTERCEPT) INTERCEPT DETECTOR RESEARCH Final Report
C. L. Nikias and Kai T. Woo 13 Nov. 1985 239 p refs
(Contract N00014-82-C-0585)
(AD-A164485; AD-E900539; R8511-3) Avail: NTIS HC A11/MF A01 CSCL 17/2

We examine in this report the problem of wideband detection of a spread spectrum signal from an interceptor's viewpoint; our aim is to derive, evaluate and compare various detector structures whose purpose is to intercept a spread-spectrum communication transmitter. The transmitter under surveillance employs a variety of modulation/spreading/transmission techniques which are invariably assumed to emit the message-bearing signal in deep background noise or interference. Thus, the challenging task of the intercepting detector is to reveal as best as possible any transmission of the unknown spread waveform in the presence of an obscuring noisy environment. Naturally, the degree of success achieved by the interceptor when detecting the presence of the communicator's spread signal depends on the amount of information available to him regarding the structure of that signal. At one extreme, the interceptor's most fortunate situation would be to acquire the spreading code itself (crack the code). If this is too demanding, he must settle for less, such as approximate knowledge of the signal's carrier center frequency, code rate, code epoch, spreading bandwidth, etc., or a subset thereof. At the other extreme, he might know almost nothing, in which case, he could resort to a simple energy discriminator device (i.e., radiometer) since it is, on many occasions, a low-SNR asymptotically optimal detector. GRA

N86-25668# Naval Postgraduate School, Monterey, Calif.
DESIGN, CONSTRUCTION AND TESTING OF A PROTOTYPE FIN-LINE MAGIC-TEE AND FIN-LINE MONOPULSE SYSTEM SUITABLE FOR MILLIMETER-WAVE APPLICATIONS M.S. Thesis
James W. Rowley Dec. 1985 114 p refs
(AD-A164521) Avail: NTIS HC A06/MF A01 CSCL 17/9

This thesis describes a fin-line 180 degree hybrid (magic-tee) that is suitable for use in monopulse radar antennas at microwave and millimeter-wave frequencies. The three-dimensional junction of a waveguide magic-tee is replaced with fin-line slots, coupled fin-line slots and microstrip lines mounted in a waveguide fixture. The planar geometry on the substrate provides significant reduction in size and eliminates the waveguide rat race that is associated with conventional hybrids. Ports one and two are flared into fin-line horns to produce a fin-line monopulse system. Suggestions for further development of the fin-line magic-tee and monopulse system are presented. GRA

N86-25669# Naval Postgraduate School, Monterey, Calif.
JAMMING EFFECTS ON M-ARY COHERENT AND BINARY NONCOHERENT DIGITAL RECEIVERS USING RANDOM JAMMER MODELS M.S. Thesis
Luis A. Munoz Dec. 1985 113 p refs
(AD-A164522) Avail: NTIS HC A06/MF A01 CSCL 17/4

The purpose of this work is to analyze and evaluate the effect of jamming waveforms on both coherent and noncoherent digital communications receivers. Specifically, random processes are utilized as jamming models in which it is assumed that the jamming waveforms have been produced by a shaping filter driven by white Gaussian noise. Such jamming waveforms are then assumed to be present at the input of known receiver structures (in addition to the signals and channel noise normally present), and optimum jamming waveform spectra are determined for different receiver schemes and modulation techniques. Graphical results based on numerical analyses are presented in order to demonstrate the effect of different jamming strategies on receiver performance. In order to quantify receiver performance, bit error probabilities are determined for binary modulation systems and symbol error probabilities are determined for M-ary modulation systems. In each case, the error probabilities are functions of signal-to-noise ratio (SNR) and jammer-to-signal ratio (JSR). Results show that it is generally possible to significantly degrade the performance of binary as well as M-ary modulation communication receivers by introducing suitably chosen jamming waveforms. GRA

N86-25670# Department of the Navy, Washington, D. C.
RADAR DOPPLER PROCESSOR USING A FAST ORTHOGONALIZATION NETWORK Patent Application
Karl Gulach, inventor (to Navy) Filed 11 Oct. 1985 21 p
(AD-D012158; US-Patent-Appl-SN-786982) Avail: NTIS HC A02/MF A01 CSCL 17/9

A radar doppler processor, comprising M, M = N-1, tap delay lines; N digital multipliers; a N-point fast fourier transform network; and a fast orthogonalizing network to orthogonalize each subband output signal to eliminate cross-correlations between all output signals. GRA

N86-25671# Naval Research Lab., Washington, D. C.
NARROWBAND INTEGRATED VOICE DATA SYSTEM BASED ON THE 2400-b/s LPC (LINEAR PREDICTIVE CODER) Interim Report, Oct. 1984 - Jul. 1985
George S. Kang 30 Dec. 1985 17 p refs
(AD-A163158; NRL-8942) Avail: NTIS HC A02/MF A01 CSCL 17/2

This report presents a narrowband integrated voice/data system which is achieved by modifying the Government-standard linear predictive coder (LPC) operation at 2400 bits per second (b/s) to transmit both speech and digital data simultaneously. The presence of the digital data in the speech bit-stream, however, does not cause operational incompatibility with other Government-standard LPCs which dont have this capability. Since the LPC will be widely deployed in tactical platforms to support command and control of the armed forces, the capability of transmitting simple graphics or typed messages along with continuous conversation would enhance the effectiveness of tactical voice communications. According to our experimentation, digital data up to approximately 75 b/s can be transmitted during continuous conversation without deteriorating the intelligibility of the LPC processed speech. GRA

N86-25672# Technical Univ. of Denmark, Lyngby. Inst. of Electromagnetics.
AN OPTICAL FIBER COMMUNICATION SYSTEM BASED ON COHERENT MODULATION, PART 1 Final Technical Report, Apr. - Jul. 1985
Gunnar Jacobsen Jun. 1985 109 p refs
(Contracts DAJA37-82-C-0735; DA Proj. 1T1-61102-BH-57)
(AD-A163168) Avail: NTIS HC A06/MF A01 CSCL 17/2

Coherent optical communication systems have potential application possibilities which make them a very interesting research area. Compared to present optical communication systems operating at 1.3 micron or 1.55 micron they can operate with 20 dB's increase in receiver sensitivity which allows around 100 km increase in repeater separation for point to transmission systems. In addition, fully developed coherent systems will allow multiplexing and demultiplexing of several hundreds of information channels all transmitted via just one single mode fiber. GRA

N86-25673# Technical Univ. of Denmark, Lyngby. Inst. of Electromagnetics.
AN OPTICAL FIBER COMMUNICATION SYSTEM BASED ON COHERENT MODULATION, PART 2 Final Technical Report, Apr. - Jul. 1985
Gunnar Jacobsen Jun. 1985 109 p
(Contracts DAJA37-82-C-0735; DA Proj. 1T1-61102-BH-57)
(AD-A163169) Avail: NTIS HC A06/MF A01 CSCL 17/2

Phase delay between intensity and frequency modulation of a semiconductor laser; spectral behavior of a directly current-modulated CSP laser; a theoretical and experimental analysis of modulated laser fields and power spectra; current/frequency-modulation characteristics for directly optical frequency-modulated injection lasers at 830 nm and 1.3 micrometers; optical phase

modulation and homodyne detection using an injection locked laser transmitter; and frequency stabilization of single mode semiconductor lasers at 830 nm and 1.3 micrometers are among the topics discussed. GRA

N86-25674# Department of the Air Force, Washington, D.C.
SIMULTANEOUS NULLING IN THE SUM AND DIFFERENCE PATTERNS OF A MONOPULSE RADAR ANTENNA Patent
Randy L. Haupt, inventor (to Air Force) Issued 26 Nov. 1985 34 p Supersedes AD-D010349
(AD-D012084; US-Patent-4,555,706; US-Patent-Appl-SN-498334; US-Patent-Class-343-379) Avail: US Patent and Trademark Office CSCL 17/9

A monopulse radar has a single set of adaptive weights shared by both sum and difference channels. The radar utilizes algorithms that effect simultaneous nulling in the sum and difference patterns of its phased array antenna. Algorithms are developed for both amplitude and phase nulling and for phase only nulling.
Author (GRA)

N86-25675# Department of the Air Force, Washington, D.C.
APPARATUS FOR SCANNING AND MEASURING THE NEAR-FIELD RADIATION OF AN ANTENNA Patent Application
Poirier, inventor (to Air Force) Filed 6 Nov. 1985 23 p
(AD-D012086; US-Patent-Appl-SN-795400) Avail: NTIS HC A02/MF A01 CSCL 20/14

Apparatus for measuring the near-field radiation of an antenna such that its far-field radiation characteristics can be determined is described. The invention utilizes the principle of the Foucault pendulum. It uses a bob attached to a long pendulum arm that is free to rotate. Rotation of the Earth causes an apparent rotation of the swing plane of the pendulum with a period of T=24/sin (latitude). By attaching a field sensing probe to the pendulum bob and mounting the antenna under the Foucault pendulum, the entire antenna aperture can be scanned without moving the antenna. The motion of the probe covers part of an external sphere centered at the pivot point of the pendulum and having a radius equal to the length of the pendulum. Appropriate transformation of the measured near-field data gives the far-field radiation pattern. GRA

N86-25676# Department of the Air Force, Washington, D.C.
AUTONOMOUS SYNCHRONIZATION OF A BISTATIC SYNTHETIC APERTURE RADAR (SAR) SYSTEM Patent Application
Norman E. Powell, inventor (to Air Force) Filed 12 Nov. 1985 55 p
(AD-D012094; US-Patent-Appl-SN-795571) Avail: NTIS HC A04/MF A01 CSCL 17/9

An airborne bistatic radar synchronization apparatus and process is presented which receives clutter point echo returns from the bistatic radar receiver on a penetrator aircraft, and determines therefrom the location of the illuminator aircraft without the need of receiving direct path signals from the radar transmitter on board the illuminator aircraft. Once the state of the illuminator aircraft (position and velocity) has been determined, the estimate of the illuminator state may be refined using direct path data. Finally, a target location algorithm is applied to bistatic target echo returns to calculate an equivalent monostatic range for a desired target, and provide an estimate of the location of the target. GRA

N86-25677# Department of the Air Force, Washington, D.C.
MULTIBEAM LENS ANTENNAS Patent
Roger E. Clapp, inventor (to Air Force) Issued 10 Dec. 1985 14 p
(AD-D012108; US-Patent-4,558,324; US-Patent-Appl-SN-511591; US-Patent-Class-343-754) Avail: US Patent and Trademark Office CSCL 09/5

Multibeam lens antennas are often circular, and utilize propagation in disk-shaped parallel-surface regions. There is phase correction through terms in theta squared, where theta is the angle of an aperture point measured from the boresight direction. In the new designs herein, the lens comprises two portions, each being two closely spaced plates with a dielectric medium between them. One portion is formed as a surface of revolution(cyclindrical or conical) with two circular ends, one end being an aperture with element feedpoints coupled to array elements. The other portion is a cap joined to the other end of the first portion. The cap may be a disk or a segment of a sphere. The dimensions and indices of refraction are selected to provide focus points for feed ports, with each focus being for a specific beam direction. The parameters may be selected so that the focus points are within the cap, at the periphery of the cap, or at the aperture. GRA

N86-25678# Department of the Air Force, Washington, D.C.
APPLIQUE RATE CONVERTER Patent
Leonard R. Novick, inventor (to Air Force) Issued 10 Dec. 1985 9 p
(AD-D012111; US-Patent-4,558,445; US-Patent-Appl-SN-601520; US-Patent-Class-370-84) Avail: US Patent and Trademark Office CSCL 17/2

The applique rate converter permits a digital multiplexer to support any data rate less than half of its input port design rate. The applique rate converter develops a composite data stream consisting of alternate data bits and data boundary bits. The data boundary bits change state at each new data bit (corresponding to a change in the data clock.) The composite bit stream is increased to the output data rate by means of a circuit called the synchronizer. At the demultiplex side of the applique, the data is separated from the composite stream by a decoding process and, if necessary, the data stream is rate smoothed. The major sections of the applique rate converter are the synchronizer at the multiplex side and the data separator and rate smoothing circuits at the demultiplex side. GRA

N86-25679# Department of the Navy, Washington, D. C.
PULSE COMPRESSION SIDELOBE SUPPRESSOR Patent
Bernard L. Lewis and Frank F. Kretschmer, Jr., inventors (to Navy) Issued 26 Mar. 1985 6 p
(AD-D012115; US-Patent-4,507,659; US-Patent-Appl-SN-506945; US-Patent-Class-343-17.2 PC) Avail: US Patent and Trademark Office CSCL 09/5

A method and apparatus for reducing the peak to peak-sidelobe ratio of the compressed pulse output signal of a symmetrical frequency derived phase coded pulse expander-compressor is described. The apparatus includes a band-width limiting device connected to the output of a symmetrical frequency derived phase coded pulse expander-compressor. GRA

N86-25680# Lawrence Livermore National Lab., Calif.
BEHAVIOR OF VERY LARGE SHORT PULSE ANTENNAS. REVISION 1
H. M. Buettner and A. J. Spero Oct. 1985 72 p
(Contract W-7405-eng-48)
(DE86-004180; UCID-20080-Rev-1) Avail: NTIS HC A04/MF A01

The electromagnetic behavior of a pulsed array of radiating elements can exhibit marked differences from standard continuous wave (CW) behavior when the physical size of the array, D, exceeds the physical pulse length, cT (speed of light times pulse duration). Herein is presented a simple analytical model and the results of computer code calculations which explain and illustrate those differences. Further elaborated is the behavior of these very large transient antennas (VLTA) using computer codes to illustrate the effects on the radiation pattern when the radiators exhibit randomness of turn-on time, phase, or amplitude. Results show that the physical space into which a linear VLTA radiates can significantly be divided into two regions by the off-axis angle THETA(sub T) identical to arcsin (cT/D). Within the near-axis region (THETA < THETA(sub T)), the behavior of a coherently radiating (pulses simultaneously initiated) array is dominated by a CW antenna pattern. That is, the lobe structure found in the energy-deposition pattern is essentially that of the CW case. In the far-axis region (THETA > THETA (sub T) the behavior of acoherently radiating array is dominated by transient effects. No CW-like pattern is seen; instead the energy-deposition pattern is roughly prop ortional to 1/sin (sq) THETA with only a suggestion of lobes. DOE

N86-25681# Oak Ridge National Lab., Tenn.
DESCRIPTION OF A TENTATIVE US-USSR COMMON COMMUNICATION FORMAT
N. B. Cove, A. A. Brooks, S. Salazkina, I. (State Public Library for Science and Technology, Moscow), V. V. Kapralova, I. M.. Kharina, G. D. Matiushin, M. A. Avetisov (All-Union Inst. of Scientific and Technical Information, USSR), O. V. Zhukovets, A. S. Barinov (State Committee for Science and Technology, Moscow), N. V. Turtanov et al Nov. 1985 380 p Prepared in cooperation with Gosudarstvennyj Publichnaya Nauchno-Tekhnicheskaya Biblioteka SSSR, Moscow; Vsesoyuznyj Inst. Nauchnoj i Tekhnicheskoj Informatsii, Moscow (USSR);Gosudarstvennyj Komitet So
(Contract DE-AC05-84OR-21400)
(DE86-004676; ORNL/CSD/TM-232) Avail: NTIS HC A17/MF A01

The Soviet-American Research Group for the Development of a Common Communication Format for Exchange of Bibliographic Information has prepared a draft format covering books, industrial catalogs, serials, articles, patents, and technical reports. This draft is intended to provide a possible format for exhange of bibliographic records on magnetic tape. Field definitions (tags, indicators, and subfields) are proposed for 105 bibliographic fields. International Standard ISO-2709 is used for the record structure on magnetic tape. DOE

N86-25682# Mississippi Univ., University. Dept. of Electrical Engineering.
HYBRID EQUATION APPROACH FOR THE SOLUTION OF ELECTROMAGNETIC SCATTERING PROBLEMS INVOLVING ARBITRARILY SHAPED INHOMOGENEOUS DIELECTRIC BODIES Final Report, Jul. 1982 - Sep. 1985
Z. Gong and A. W. Glisson Dec. 1985 174 p refs
(Grant NSF ECS-82-04683)
(PB86-141793) Avail: NTIS HC A08/MF A01 CSCL 20N

A numerical procedure is presented for use in the solution of electromagnetic scattering problems involving arbitrarily shaped inhomogeneous dielectric bodies. The solution procedure has been developed in such a way that fairly large scatters should be amenable to treatment via sparse matrix techniques or iteration and, in addition, so that other scatterers may be included in the vicinity of the inhomogeneous body with the usual simplicity of moment method formulations. The scattering problems are formulated via hybrid integral equation/partial differential equation approach in which the inhomogeneous region is modeled by the partial differential equations for the electric or magnetic field directly, while the radiation condition is incorporated via integral equation at the surface of the homogeneous body. The method of moments is applied so that existing surface integral equation computer codes for homogeneous bodies can be used, with only minor alterations, to generate the block of the matrix corresponding to the equivalent surface current interactions. GRA

N86-25683# National Telecommunications and Information Administration, Boulder, Colo. Inst. for Telecommunication Sciences.
MILLIMETER-WAVE URBAN AND SUBURBAN PROPAGATION MEASUREMENTS USING NARROW AND WIDE BANDWIDTH CHANNEL PROBES
E. J. Violette, R. H. Espeland, and G. R. Hand Nov. 1985 89 p refs
(PB86-147741; NTIA-85-184) Avail: NTIS HC A05/MF A01 CSCL 17B

Measurements reported are part of a study of propagation characteristics for millimeter-wave communication links operating in an urban-suburban environment. Absorption data were collected for signals propagated through some common building materials. At these same channel frequencies, paths at street level obstructed by office buildings and residential properties were examined in terms of received signal levels resulting from direct penetration and/or propagation by diffraction modes with terminal separation of from 0.1 to 1.2 km. Signal fading was measured for line-of-sight paths traveled down an urban street. Narrow- and wide-beam antenna patterns and both modes of linear antenna polarization were used to compare multipath fading characteristics. A unique 30.3 GHz wide bandwith channel impulse probe was used to record multipath signal amplitudes and delay times. Impulse response measurements were recorded as the transmitter traveled along the urban street. GRA

N86-25684# National Weather Service, Salt Lake City, Utah.
NWR (NATIONAL WEATHER SERVICE) VOICE SYNTHESIS PROJECT, PHASE 1
G. W. Sampson Jan. 1986 75 p
(PB86-145604; NOAA-TM-NWS-WR-192) Avail: NTIS HC A04/MF A01 CSCL 17B

The purpose of the NOAA Weather Radio (NWR) Voice Synthesis Project is to provide a demonstration of the current voice synthesis technology. Phase 1 of this project is presented, providing a complete automation of an hourly surface aviation observation for broadcast over NWR. In examining the products currently available on the market, the decision was made that synthetic voice technology does not have the high quality speech required for broadcast over the NWR. Therefore the system presented uses the phrase concatenation type of technology for a very high quality, versatile, voice synthesis system. GRA

N86-25685# National Telecommunications and Information Administration, Boulder, Colo. Inst. for Telecommunication Sciences.
ISDN (INTEGRATED SERVICES DIGITAL NETWORK): NUMBERING, ADDRESSING AND INTERWORKING
V. J. Pietrasiewicz, J. J. Austin, and R. F. Linfield Oct. 1985 133 p
(PB86-143617; NTIA-85/182) Avail: NTIS HC A07/MF A01 CSCL 17B

The factors that affect the design of a numbering plan for the Integrated Services Digital Network (ISDN) involved a complex interplay between existing plans, national priorities, and technical system limitations. These factors are the subject of the report. Desirable attributes of any numbering plan are explained, existing standards covering various plans are discussed and some actual plans currently in use are examined. The development of the numbering plan for ISDN by the Consultative Committee for International Telegraph and Telephone is essentially complete. GRA

N86-25686# National Bureau of Standards, Boulder, Colo. Electromagnetic Fields Div.
POSSIBLE ESTIMATION METHODOLOGIES FOR ELECTROMAGNETIC FIELD DISTRIBUTIONS IN COMPLEX ENVIRONMENTS
M. Kanda, J. Randa, and N. S. Nahman Mar. 1985 52 p refs (PB86-167327; NBS/TN-1081) Avail: NTIS HC A04/MF A01 CSCL 20C

The problem of measuring and characterizing complicated multiple-source, multiple-frequency electromagnetic environments is becoming more important and more difficult as electrical devices proliferate. The paper outlines three general approaches to the problem which are currently under investigation at the National Bureau of Standards. The three approaches are: (1) a statistical treatment of the spatial distribution of electromagnetic field intensities; (2) a numerical computation using a finite-difference (or lattice) form of the electromagnetic action functional; and (3) use of a directional probe to scan a volume. All three methods are still in the development stage, but each appears promising. GRA

N86-25687# RAND Corp., Santa Monica, Calif.
TELECOMMUNICATIONS ALTERNATIVES FOR FEDERAL USERS: MARKET TRENDS AND DECISIONMAKING CRITERIA
L. L. Johnson, M. A. Sirbu, and B. M. Mitchell Dec. 1985 237 p refs Sponsored by NSF
(Grant NSF PRA-84-00689)
(PB86-153764; R-3355-NSF; ISBN-0-8330-0692-4; NSF/PRA-85023) Avail: NTIS HC A11/MF A01 CSCL 17B

The telecommunications market has been marked by growing

competition in local and long-distance transmission and in terminal equipment. In response to this, the goal of the study is to show what kinds of information government agencies should collect, and how they should use it, to improve decision making. The study considers four objectives: (1) to identify and assess options for meeting voice and data needs, taking into account technical, economic, and regulatory constraints; (2) to show how Federal agencies can evaluate their needs in light of the options for supplying them; (3) to establish criteria for evaluating the relative merits of options in light of these needs; and (4) to construct a decision making framework for choosing among options, taking into account uncertainties about costs, performance, and benefits. Author (GRA)

N86-25688# Federal Communications Commission, Washington, D. C. Office of Plans and Policy.

PROMOTING COMPETITION BETWEEN INTERNATIONAL TELECOMMUNICATION CABLES AND SATELLITES

E. R. Kwerel and J. E. McNally Jan. 1986 91 p refs
(PB86-156288; FCC/OPP/WP86-19) Avail: NTIS HC A05/MF A01 CSCL 17B

Evidence that the services of international telecommunication facilities have not been provided in the most economically efficient way is presented. Distorted investment decisions may be the result of the Commission's policies of allocating traffic among international facilities and applying rate-of-return regulation to international businesses. Alternative policies that rely on restructuring private incentives rather than increasing the Commission's direct involvement in facility planning are suggested. GRA

N86-25689*# Smithsonian Astrophysical Observatory, Cambridge, Mass.

SYSTEM ENGINEERING STUDY OF ELECTRODYNAMIC TETHER AS A SPACEBORNE GENERATOR AND RADIATOR OF ELECTROMAGNETIC WAVES IN THE ULF/ELF FREQUENCY BAND Semiannual Report, 1 Sep. 1985 - 28 Feb. 1986

Robert D. Estes, Mario D. Grossi, and Enrico C. Lorenzini Mar. 1986 48 p refs
(Grant NAG8-551)
(NASA-CR-176749; NAS 1.26:176749; SAR-1) Avail: NTIS HC A03/MF A01 CSCL 20N

The transmission and generation by orbiting tethered satellite systems of information carrying electromagnetic waves in the ULF/ELF frequency band to the Earth at suitably high signal intensities was examined and the system maintaining these intensities in their orbits for long periods of time without excessive onboard power requirements was investigated. The injection quantity power into electromagnetic waves as a function of system parameters such as tether length and orbital height was estimated. The basic equations needed to evaluate alternataing current tethered systems for external energy requirements are presented. The energy equations to tethered systems with various lengths, tether resistances, and radiation resistances, operating at different current values are applied. Radiation resistance as a function of tether length and orbital height is discussed. It is found that ULF/ELF continuously radiating systems could be maintained in orbit with moderate power requirements. The effect of tether length on the power going into electromagnetic waves and whether a single or dual tether system is preferable for the self-driven mode is discussed. It is concluded that the single tether system is preferable over the dual system. E.A.K.

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N86-25690# Lawrence Livermore National Lab., Calif.

TEST FACILITY FOR THE EVALUATION OF MICROWAVE TRANSMISSION COMPONENTS

C. G. Fong and B. R. Poole 2 Oct. 1985 8 p Presented at the 11th Symposium on Fusion Engineering, Austin, Tex., 18-22 Nov. 1983
(Contract W-7405-eng-48)
(DE86-003891; UCRL-92582; CONF-851102-23) Avail: NTIS HC A02/MF A01

A Low Power Test Facility (LPTF) was developed to evaluate the performance of Electron Cyclotron Resonance Heating (ECRH) microwave transmission components for the Mirror Fusion Test Facility (MFTF-B). The facility generates 26 to 60 GHz in modes of TE01, TE02, or TE03 launched at power levels of 1/2 milliwatt. The propagation of the RF as it radiates from either transmitting or secondary reflecting microwave transmission components is recorded by a discriminating crystal detector mechanically manipulated at constant radius in spherical coordinates. The facility is used to test, calibrate, and verify the design of overmoded, circular waveguide components, quasi-optical reflecting elements before high power use. The test facility consists of microwave sources and metering components, such as VSWR, power and frequency meters, a rectangular TE10 to circular TE01 mode transducer, mode filter, circular TE01 to 2.5 in. diameter overmoded waveguide with mode converters for combination of TE01 to TE03 modes. This assembly then connects to a circular waveguide launcher or the waveguide component under test. DOE

N86-25691# Oak Ridge National Lab., Tenn.

TEMPERATURE DEPENDENT ELECTRON TRANSPORT STUDIES FOR DIFFUSE DISCHARGE SWITCHING APPLICATIONS

S. R. Hunter, J. G. Carter, L. G. Christophorou, and S. M. Spyrou 1985 9 p
(Contract DE-AC05-84OR-21400)
(DE86-004213; DOE/OR-21400/T213) Avail: NTIS HC A02/MF A01

A diffuse gas discharge switch must be capable of high speed, repetitive switching without significant degradation of its electron conduction and opening characteristics if it is to be useful in pulsed power switching applications. Whenever the switch is fired, the gas temperature T within the switch is expected to rise several degrees centigrade, and operating temperatures of several hundred degrees are likely for repetitively operated switches. The electron transport and rate coefficients, such as the electron drift velocity and the electron attachment coefficient for the most promising gas mixtures under study are expected to be funcions of T, and consequently, knowledge of these parameters as a function of T is desirable for modeling the operation of the diffuse discharge switch in practical application. Measurements of these parameters in C2F6/buffer gas (Ar, Ch4, N2) mixtures have been made and are reported. The electron attachment rate constant has also been measured for C2F6 and C3F8 as a function of the mean electron energy over the temperature range 300 less than or equal to T less than or equal to 750 K. For C2F6, the electron attachment rate constant has been found to increase by 30% over this temperature range, while for C3F6, the attachment rate constant first decreases when the temperature is increased to approximately 450 K and then significantly increases with increasing T. An interpretation of these measurements and their significance in repetitively operated diffuse discharge switching gas mixtures is outlined. DOE

N86-25692# Massachusetts Univ., Amherst. Dept. of Electrical and Computer Engineering.

OPTIMIZATION OF LOW NOISE MILLIMETER-WAVE RECEIVER FRONT-ENDS Ph.D. Thesis

Gamal Mahmoud Hegazi May 1986 170 p refs
Avail: NTIS HC A08/MF A01

Mixer noise theory is modified to take into account sources of excess noise in the mixer diode which differ from the classical thermal and shot noise sources. These excess noise sources are,

for the case of a GaAs Schottky diode: hot electron, trap, and intervalley scattering noise. Taking these noise sources into account, the analysis of millimeter wave mixers at both room temperature and cryogenic temperature is carried out to study the conditions for optimum embedding circuit and diode for minimum noise temperature. A performance analysis of a quasi-optical planar mixer is presented and the calculated results are compared with experimental measured ones. Finally, a balanced quasi-optical slotring mixer is utilized as an array element in a heterodyne monopulse system and a proof of concept experiment is demonstrated at X band. Author

N86-25693*# California Inst. of Tech., Pasadena. Power Electronics Group.
INPUT-CURRENT SHAPED ac TO dc CONVERTERS Final Report
May 1986 49 p refs
(Grant NAG3-615)
(NASA-CR-176787; NAS 1.26:176787; EE116-81) Avail: NTIS HC A03/MF A01 CSCL 09A

The problem of achieving near unity power factor while supplying power to a dc load from a single phase ac source of power is examined. Power processors for this application must perform three functions: input current shaping, energy storage, and output voltage regulation. The methods available for performing each of these three functions are reviewed. Input current shaping methods are either active or passive, with the active methods divided into buck-like and boost-like techniques. In addition to large reactances, energy storage methods include resonant filters, active filters, and active storage schemes. Fast voltage regulation can be achieved by post regulation or by supplementing the current shaping topology with an extra switch. Some indications of which methods are best suited for particular applications concludes the discussion. Author

N86-25694*# Wisconsin Univ., Madison. Dept. of Electrical and Computer Engineering.
POWER CONVERSION DISTRIBUTION SYSTEM USING A RESONANT HIGH-FREQUENCY AC LINK
Pradeep K. Sood and Thomas A. Lipo 1986 6 p
(Grant NAG3-492)
(NASA-CR-176804; NAS 1.26:176804) Avail: NTIS HC A02/MF A01 CSCL 10B

Static power conversion systems based on a resonant high frequency (HF) link offers a significant reduction in the size and weight of the equipment over that achieved with conventional approaches, especially when multiple sources and loads are to be integrated. A faster system response and absence of audible noise are the other principal characteristics of such systems. A conversion configuration based on a HF link which is suitable for applications requiring distributed power is proposed. Author

N86-25695*# National Aeronautics and Space Administration, Washington, D.C.
INFLUENCE OF THE TEMPERATURE OF ELECTRODE MATERIAL ON ITS DISINTEGRATION UNDER THE ACTION OF AN ARC DISCHARGE IN HYDROGEN
A. V. Bolotov and S. A. Yukhimchuk Aug. 1985 11 p refs Transl. by The Corporate Word, Inc., Pittsburgh, Pa.
(Contract NASw-4006)
(NASA-TM-77893; NAS 1.15:77893) Avail: NTIS HC A02/MF A01 CSCL 09C

An analysis is made of the electrophysical processes occurring at the end surface of rod electrodes during constant and alternating arc discharge in hydrogen. Experiments are reported on the effect of surface temperature of tungsten electrodes on their erosion. The influence of activating additions of thorium oxide, the structure of the tungsten, and the gas surrounding the electrode on the specific thermal loading and the erosion of the electrodes is discussed. Author

N86-25696# Chicago Univ., Ill.
CURRENT DISTRIBUTION IN ESD (ELECTRON STIMULATED DESORPTION) DIODES. CROSS SECTION CORRECTIONS
J. C. Lin and R. Gomer Nov. 1985 33 p refs
(Contract N00014-77-C-0018)
(AD-A163646; Rept-4) Avail: NTIS HC A03/MF A01 CSCL 09/1

The electron current distribution in diodes consisting of a rectangular crystal and an electron emitting filament parallel to and in front of it, used in several electron stimulated desorption (ESD) experiments has been determined by means of a dummy crystal constructed from uniformly transparent Lektromesh and a moveable, suitably constructed fine probe. It was found that for straight filaments the distribution was uniform along the narrow, but nearly triangular along the long dimension of the crystal. GRA

N86-25697# Stanford Univ., Calif. Electronics Lab.
JOINT SERVICES ELECTRONICS PROGRAM Final Annual Progress Report, 1 May 1984 - 30 Apr.1985
J. S. Harris Nov. 1985 15 p refs
(Contract DAAG29-84-K-0047)
(AD-A163755; ARO-21317.8-EL) Avail: NTIS HC A02/MF A01 CSCL 09/3

This is the final report of the research conducted at the Stanford Electronics Laboratories under the sponsorship of the Joint Services Electronics Program from May 1, 1984 through April 30 1985. This report summarizes the areas of research, identifies the most significant results, and lists the dissertations and publications sponsored by the contract (DAAG29-84-K-0047). Submicron devices, VLSI, information systems, and feedback vector quantizers are among the topics discussed. GRA

N86-25698 Department of the Air Force, Washington, D.C.
DATA ACQUISITION CHANNEL APPARATUS Patent
Charles H. Higgins, inventor (to Air Force) and John D. Skipper, inventor (to Air Force) Issued 8 Oct. 1985 7 p
(AD-D011969; US-Patent-4,546,343; US-Patent-Appl-SN-627691; US-Patent-Class-340-347) Avail: US Patent and Trademark Office CSCL 09/5

Dicussed is a hybrid integrated circuit data acquisition channel apparatus employing an operational amplifier fed by a low current differential bipolar transistor preamplifier having separate feedback gain and signal gain determining elements and providing an amplified signal output to a sample and hold and analog-to-digital converter circuits. The disclosed apparatus operates with low energy and small space requirements and is capable of operations without the sample and hold circuit where the nature of the applied input signal permits. GRA

N86-25699# ERA Ltd., Leatherhead (England).
INVESTIGATION OF MARGINAL VOLTAGE ANALYSIS FOR DEFECT LOCATION IN INTEGRATED CIRUCITS Final Technical Report, Aug. 1983 - Jun. 1984
E. H. Maher Oct. 1985 91 p
(Contract F49620-83-C-0123)
(AD-A163033; RADC-TR-85-184) Avail: NTIS HC A05/MF A01 CSCL 09/5

Digital integrated circuits tend to be classified as either good or bad when tested by standard equipment. Standard testing techniques fail to detect a group of circuits that pass normal testing but then fail after a short time of actual use. These circuits represent a reliability hazard for systems. For high reliability applications a burn-in test is used to eliminate these devices with latent defects. Some devices though survive the burn-in test only to fail later for reasons usually associated with failure mechanisms that are not accelerated by the burn-in test. An alternate screening technique is needed to eliminate these devices. A technique for detecting these reliability rogues has been studied along with a modification to the technique that will allow a more rapid location of the physical defect sites. GRA

N86-25700# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
MODELING AND SIMULATION OF A SIGNAL PROCESSOR IMPLEMENTING THE WINOGRAD FOURIER TRANSFORM

M.S. Thesis
James M. Collins Dec. 1985 191 p refs
(AD-A164049; AFIT/GE/ENG/85D-9) Avail: NTIS HC A09/MF A01 CSCL 09/5

Continuing advances in the state of the art silicon fabriaction technology have allowed tremendous increases in the performance which may be achieved by a single integrated circuit. The natural counterpart of this increased functionality is, of course, increased design complexity. A growing problem is how to concisely and accurately communicate design information on VLSI and VHSIC class circuits. The VHSIC program office has sponsored the development of a hardware description language designed to address this problem. The VHSIC Hardware Description Language (VHDL) was applied to the problem of modeling a custom signal processor employing the Winograd Fourier Transform. A methodology was developed which decomposes the architecture into subcomponents, and then models the behavior and structure of the macrocells which comprise those subcomponents. Additionally, a custom simulator was developed to verify the timing, control, and hardware macrocells used in the implementation of the signal processor. The simulation modeled the circuit at the bit level and validated the architecture and expected numerical performance. GRA

N86-25701# Naval Postgraduate School, Monterey, Calif.
THE RADIATION EFFECTS OF HIGH ENERGY ELECTRONS UPON THERMIONIC INTEGRATED CIRCUITS M.S. Thesis
William R. Arguello Dec. 1985 74 p refs
(AD-A164124) Avail: NTIS HC A04/MF A01 CSCL 09/5

Thermionic Integrated Circuit (TIC) devices use a hybrid of vacuum tube and integrated circuit technology. The integrated circuitry is fabricated on a sapphire (Al2O3) substrate. A device was irradiated to attempt to establish a total dose (measured in rad Si) of radiation to cause the TIC device to malfunction. The TIC device was irradiated using 30 and 100 Mev electrons provided by the Naval Postgraduate School Linear Accelerator (LINAC). The device received a total dose of 1.8155 x 10 to the ninth power rad Si during the course of the experiments. It continued to function normally through the irradiation study, so it is concluded that the device is not sensitive to radiation, at least at the levels used. GRA

N86-25702# Hughes Research Labs., Malibu, Calif.
VLSI (VERY LARGE SCALE INTEGRATION) FLOATING POINT CHIP DESIGN STUDY Final Report, Sep. 1983 - Nov. 1984
J. G. Nash Nov. 1985 125 p refs
(Contract N66001-83-C-0395)
(AD-A164198; NOSC-CR-312) Avail: NTIS HC A06/MF A01 CSCL 09/5

This report describes techniques for very large scale integration (VLSI) implementation of arithmetic algorithms. The report describes an algorithm for performing area-time efficient division, on-line techniques for performing bit-serial calculations, and iterative algorithms for performing square root. GRA

N86-25703# Colorado Research Development Corp., Fort Collins.
SEMICONDUCTING TRANSITION METAL SILICIDES FOR ELECTRO-OPTIC VSLI INTERCONNECTS Interim Status Report
John E. Mahan 15 Oct. 1985 6 p
(Contract N00014-85-C-0874)
(AD-A164303; ISR-1) Avail: NTIS HC A02/MF A01 CSCL 09/5

Since the start of the project on September 15, 1985, we have fabricated and partially characterized the CrSi2 thin films, and made preparations for improved optical measurement and for investigating the two other proposed materials, MnSi(1.7) and IrSi(1.75). These are detailed: Chromium Silicide Formation, X-ray Diffraction Analysis of the Films, Resistivity Measurements, Optical Measurements; and Preparations for MnSi(1.7) and IrSi(1.7r). GRA

N86-25704# Naval Postgraduate School, Monterey, Calif.
ELECTRON IRRADIATION OF N CHANNEL SILICON ON SAPPHIRE INSULATED GATE FIELD EFFECT TRANSISTORS (IGFET) M.S. Thesis
Robert A. Pornaras Dec. 1985 111 p refs
(AD-A164520) Avail: NTIS HC A06/MF A01 CSCL 09/1

SOS, n-channel, insulated gate field effect transistors (IGFETs) were irradiated at room temperature wht a 30 MeV electron beam at doses from 104 to 106 Rads (Si). The effects of the irradiation on IGFET performance were evaluated by measuring threshold voltage decreased after each irradiation, up to the highest dose. The threshold voltage behavior was as expected for an n-channel IGFET undergoing gate oxide charge build-up. The total dose was not large enough to exhibit threshold voltage increases indicative of interface state generation. The IGFETs were allowed to anneal for 107 hours at room temperture. The threshold voltage recovered to approximately sixty-five percent of its pre-irradiation value within thirty hours. It then increased slowly to about seventy-five percent of its pre-irradiation value by the end of the observed annealing time. Threshold voltage rebound was not observed. GRA

N86-25705# GTE Labs., Inc., Waltham, Mass.
INVESTIGATION OF OPENING SWITCH MECHANISMS BASED ON CHEMICALLY REACTIVE PLASMAS Final Report, 15 Aug. 1982 - 30 Oct. 1985
W. P. Lapatovich, R. B. Piejak, and J. M. Proud Nov. 1985 37 p refs
(Contract N00014-82-C-0615)
(AD-A163171) Avail: NTIS HC A03/MF A01 CSCL 09/5

An investigation of discharge-induced chemical reactions resulting in high-density product vapors containing strongly attaching gases has been conducted to evaluate the feasibility and potential of such reactions in rapid opening plasma switches. This new concept of employing such reactions to limit and/or interrupt large currents on a microsecond time scale was studied in two element (electrodeless and electroded) devices and in three element (electroded) devices. Bimolecular and unimolecular reactions were considered. The plasma reaction between AlCl sub 3 and SiO sub 2 was studied. The electrical properties of one of the reaction products (SiCl sub 4) is reported. GRA

N86-25706# Department of the Navy, Washington, D. C.
MICROWAVE AND MILLIMETER WAVE PHASE SHIFTER Patent Application
Robert Neidert and Clifford Krowne, inventors (to Navy) Filed 12 Dec. 1985 27 p
(AD-D012082; US-Patent-Appl-SN-808697) Avail: NTIS HC A03/MF A01 CSCL 09/5

The present invention is directed generally to a variable phase shifter for millimeter wave signals, and more particularly to a variable phase shifter based on the slow-wave effect. There is increased interest in millimeter wave signal propagation both for military and commercial applications. The millimeter wave region is of interest because there are certain windows in the atmosphere in the millimeter wave region that will propagate millimeter waves for great distances. Additionally, millimeter waves will propagate through chaff and rain. In view of this interest, it is highly desirable to have millimeter wave circuit components which are compatible with solid state processing mothods, require reduced real estate area, have a decreased cost per device, and an increased yield. The phase shifter is an integral component of millimeter wave receivers, as well as other key RF components such as antennas, amplifiers, transmit-receiver switches, local oscillators and filters. GRA

N86-25707# Department of the Navy, Washington, D. C.
BATTERY TESTER Patent Application
Mark D. Poljak, inventor (to Navy) Filed 12 Aug. 1985 20 p
(AD-D012083; US-Patent-Appl-SN-764687) Avail: NTIS HC A02/MF A01 CSCL 10/3

An improved battery tester for determining the acceptability of a Lithium Sulfur Dioxide (LiSO2) storage battery at a given temperature and with one or more cells therein is discussed. The tester is generally made up of a first comparison circuit having a series of interconnected components, namely a comparator, first and second flip-flops, and an AND gate. A first resistor is parallel

connected to the first comparison circuit. A second comparison circuit is also parallel connected to the first comparison circuit and is generally made up of a series interconnected components, namely a second resistor, a capacitor, a buffer, and a second comparator. A first switch is connected to the first resistor and a second switch is parallel connected to the second comparison circuit between the capacitor and the buffer. A logic control arrangement controls the operation of both switches, both comparators, and both flip-flops for testing a battery as to its start-up voltage and performance voltage characteristics all in a relatively short time period. GRA

N86-25708# Department of the Air Force, Washington, D.C.
PI-SECTION DIGITAL PHASE SHIFTER APPARATUS Patent Application
Binboga S. Yarman, inventor (to Air Force) Filed 20 Aug. 1985 13 p
(AD-D012090; US-Patent-Appl-SN-767455) Avail: NTIS HC A02/MF A01 CSCL 09/5

An extra high frequency pi-section digital phase shifter apparatus has a diode connected between two identical parallel shunt circuits. The parallel shunt circuits connect to the series inductor/diode circuit at both the input and output and each parallel shunt circuit has an inductor connector in parallel with a capacitor and a diode to provide balanced insertion loss at each diode switching state. When the diodes of the circuit are in the forward-biased state they act as closed short circuit switches. When the diodes are reverse-biased, the inductance in the shunt circuit resonates with the diode capacitance to provide a short circuit path to the RF signal at the center frequency of the RF signal at the desired phase. GRA

N86-25709# Department of the Air Force, Washington, D.C.
T-SECTION DIGITAL PHASE SHIFTER APPARATUS Patent Application
Binboga S. Yarman, inventor (to Air Force) Filed 20 Aug. 1985 11 p
(AD-D012091; US-Patent-Appl-SN-767454) Avail: NTIS HC A02/MF A01 CSCL 09/5

A extra high frequency T-section digital phase shifter apparatus has a pair of back to back diodes connected between the input and output terminals with a parallel circuit connected between the common junction and ground. The shunt parallel circuit has an inductor in parallel with the series combination of a capacitor and a diode to provide a balanced insertion loss at each diode switching state. When the diodes are in the forward-biased state they act as closed short circuit switches and in the shunt circuit, the inductance resonates with the diode capacitance to provide a perfect transmission for the RF signal. GRA

N86-25710# Department of the Air Force, Washington, D.C.
LOW PASS PI SECTION DIGITAL PHASE SHIFTER APPARATUS Patent Application
Binboga S. Yarman, inventor (to Air Force) Filed 20 Aug. 1985 12 p
(AD-D012093; US-Patent-Appl-SN-767446) Avail: NTIS HC A02/MF A01 CSCL 09/1

A low pass Pi section digital phase shifter apparatus has an inductor and a diode connected in series between two identical parallel circuits. The parallel circuits connect to the series inductor/diode circuit at both the input and output. Each circuit has an inductor connected in parallel with a capacitor and a diode to provide balanced insertion loss at each diode switching state. When the diodes of the circuit are in the forward biased state they act as closed short circuit switches. When the diodes are reversed biased, the inductance in the series circuit resonates with the diode capacitance to provide a short circuit path to the RF signal to pass the center frequency of the RF signal at the desired phase. GRA

N86-25711# Department of the Air Force, Washington, D.C.
MICROPROCESSOR CONTROLLED RF MODULATOR APPARATUS Patent Application
Filardo, inventor (to Air Force) Filed 1 Nov. 1985 36 p
(AD-D012096; US-Patent-Appl-SN-793811) Avail: NTIS HC A03/MF A01 CSCL 17/9

The microprocessor-controlled RF modulator apparatus will provide repeatable, controlled scintillation on test bench generated low-power RF target waveforms for the purpose of providing target returns with realistic radar cross section characteristics during testing of the F-16 (or any other) fire control radar. The microprocessor-controlled RF modulator apparatus is utilized in line between an RF target signal generator and the target horn to provide a variety of target situations for testing radar hardware and software. GRA

N86-25712# Department of the Air Force, Washington, D.C.
A LOW PASS T-SECTION DIGITAL SHIFTER APPARATUS Patent Application
Binboga S. Yarman, inventor (to Air Force) Filed 20 Aug. 1985 14 p
(AD-D012097; US-Patent-Appl-SN-767578) Avail: NTIS HC A02/MF A01 CSCL 09/5

A low pass T-section digital phase shifter apparatus has a pair of serially connected inductor-diode combinations connected in series which includes a parallel circuit connected between the common junction and ground. The parallel circuit has an inductor in parallel with a series capacitor and diode to provide a balanced insertion loss at each diode switching state. When the diodes are in the forward-biased state, they act as closed short circuit switches. When the diodes are reversed-biased, the inductance in the series circuit resonates with the diode capacitance to provide a short circuit path to the RF signal to pass the center frequency of the RF signal at the desired phase. GRA

N86-25713# Department of the Air Force, Washington, D.C.
COMPACT BROADBAND RECTANGULAR TO COAXIAL WAVEGUIDE JUNCTION Patent
Joseph C. Lee, inventor (to Air Force) Issued 10 Dec. 1985 5 p
(AD-D012117; US-Patent-4,558,290; US-Patent-Appl-SN-598949; US-Patent-Class-333-126) Avail: US Patent and Trademark Office CSCL 09/1

A compact waveguide junction is described for coupling a rectangular waveguide of one frequency band to a coaxial waveguide and a second rectangular waveguide of a second frequency band to the interior of the hollow center conductor of the coaxial waveguide. GRA

N86-25714# Department of the Air Force, Washington, D.C.
DIGITAL FREQUENCY SYNTHESIZER CIRCUIT Patent
John W. Murphy and David K. Vail, inventors (to Air Force) Issued 17 Dec. 1985 8 p
(AD-D012134; US-Patent-4,559,613; US-Patent-Appl-SN-393236; US-Patent-Class-364-703) Avail: US Patent and Trademark Office CSCL 09/5

A high-resolution digital pulse to digital pulse divider circuit directly synthesizes precise frequencies having low phase noise content and phase continuity when frequency changes occur. Author (GRA)

N86-25715# Department of the Air Force, Washington, D.C.
DUAL FREQUENCY MICROSTRIP ANTENNA Patent Application
Yuen T. Lo, inventor (to Air Force) Filed 21 Oct. 1985 29 p
(AD-D012136; US-Patent-Appl-SN-771529) Avail: NTIS HC A03/MF A01 CSCL 09/5

A single element patch microstrip antenna for dual frequency operation is disclosed. By placing shorting pins at appropriate locations in the patch, the ratio of two band frequencies can be varied from 3 to 1.8. By also introducing slots in the patch, the ratio can be reduced from 3 to less than 1.3. A second embodiment of the antenna uses a c-shaped slot to obtain an even smaller ratio of two band frequencies. GRA

N86-25716# Lawrence Livermore National Lab., Calif.
SUB-200 PICOSECOND GaAs SAMPLE-AND-HOLD CIRCUIT

FOR A MULTI-GIGASAMPLE/SECOND INTEGRATED CIRCUIT
S. Swierkowski, K. Mayeda, G. Cooper, and C. McConaghy Sep. 1985 6 p Presented at the IEEE International Electron Devices Meeting, Washington, D.C., 1 Dec. 1985
(Contract W-7405-eng-48)
(DE86-002598; UCRL-92947; CONF-851237-2) Avail: NTIS HC A02/MF A01

Initial results are reported on a digital/analog, 1-micron gate GaAs MESFET IC whose purpose is to record with bandwidths exceeding 1 GHz nonrepetitive analog transient waveforms of a few nanoseconds duration. Specialized buffered-fet logic digital circuits with T (sub pd) as low as 70 psec generate a pulse burst that strobe a series of 20 linear gate sample-and-hold circuits. These 3-gate MESFET sampling circuits have demonstrated sampling apertures of less than 200 psec, without pretriggering required. Backgating effects on the circuit design and performance and high speed techniques are reviewed. Earlier work on this scheme has been extended from 1 nsec step inputs to 100 psec and variable biasing in the linear gate circuit has been added. DOE

N86-25717# Catholic Univ. of America, Washington, D.C. Dept. of Mechanical Engineering.
MEASUREMENT AND CONTROL OF ELECTROSTATIC CHARGES ON SOLIDS IN A GASEOUS SUSPENSION Technical Progress Report
S. Nieh and T. Nguyen Oct. 1985 36 p refs
(Contract DE-FG22-84PC-70778)
(DE86-003037; DOE/PC-70078/TS; TPR-5) Avail: NTIS HC A03/MF A01

Measurements of mean particle charges and charge distributions on Medium Volatile Bituminous (MVB) coals and Lignite A (LIGA) coals in a 51 mm ID grounded copper pipe loop have been made with the upgraded Faraday cage system. Both negative and positive charges were found for coals in all experiments. The dual polarities of charges are believed to be due to the nonuniform materials and chemical composition contained in coals. As expected, increasing velocity or decreasing air humidity has a significant effect to increase the mean particle charge and the standard deviation of distribution. Charge elimination by the addition of coal fines has been explored. Effective suppression of particle charges was achieved by adding 0.1% by mass of minus 1 micron coal dust into the pipe flow. A neutralization mechanism was proposed to interpret the measured results. The results of charge control obtained to date has been significant and encouraging. More work is needed to validate the proposed mechanism. DOE

N86-25718# National Bureau of Standards, Boulder, Colo. Electromagnetic Fields Div.
FINLINE DIODE SIX-PORT: FUNDAMENTALS AND DESIGN INFORMATION
M. Weidman Dec. 1985 43 p refs
(PB86-166725; NBS/TN-1090) Avail: NTIS HC A03/MF A01; also available SOD HC $1.75 as SN003-003-02714-6 CSCL 14B

The preliminary design and testing of a planar circuit six-port with diode detectors is described. The planar circuit medium was chosen to be finline, and all preliminary work was done in WR-42 waveguide (18-26.5 GHz). The finline substrate was alumina, and initially commercial beam-lead diodes were bonded to the finline metalization. The goal is to design an integrated circuit which could be fabricated on one chip (with diode detectors) and used as part of a six-port network analyzer in the waveguide bands above 18 GHz. Initial designs proved to be unsatisfactory because of high losses and reflections. Most of the problems have been solved, and a usable integrated finline circuit is a good possibility for a millimeter wave six-port. Author

N86-25719# National Bureau of Standards, Boulder, Colo. Electromagnetic Fields Div.
SITE ATTENUATION
R. G. FitzGerrell Nov. 1985 51 p refs
(PB86-169083; NBS/TN-1089) Avail: NTIS HC A04/MF A01; also available SOD HC $2.00 as SN003-003-02708-1 CSCL 09E

Site attenuation is a measure of performance of an open test site used at frequencies below about 1 GHz for antenna calibration and equipment emission and susceptibility testing. These sites typically consist of a large, obstruction-free ground plane and the hemisphere above it. Site attenuation of an ideal site is calculated and compared to data measured using the 30 m by 60 m NBS ground screen. GRA

N86-25720# National Bureau of Standards, Boulder, Colo. Electromagnetic Fields Div.
DEVELOPMENT OF NEAR-FIELD TEST PROCEDURES FOR COMMUNICATION SATELLITE ANTENNAS, PHASE 1, PART 1
A. C. Newell and A. G. Repjar Sep. 1985 82 p refs
(PB86-164357; NBSIR-85/3031) Avail: NTIS HC A05/MF A01 CSCL 09E

The purpose of the program is to define and further develop the capabilities of near-field antenna test techniques, specifically for the requirements associated with the development and verification testing of reconfigurable, multibeam, frequency reuse, commercial satellite antennas. Phase 1, Part 1 gives a general survey definition and description of near-field and compact range measurement methods as they apply to satellite antenna systems testing. Each of these methods is evaluated to determine how well they meet the measurement requirements. Included for each technique is a summary of the measurement method, discussions on probe correction and data processing, measurement hardware considerations, a results available section, and measurement accuracy and range certification considerations. The basis for the choice of the best measurement technique is established with the planar near-field measurement method receiving the best score for the directive antennas considered. GRA

N86-25721# SRI International Corp., Menlo Park, Calif.
AUTOMATIC VISUAL INSPECTION OF PRINTED CIRCUIT BOARDS Annual Report, 1 Nov. 1982 - 30 Apr. 1984
S. T. Barnard, J. A. Herson, and R. A. Cain May 1985 55 p refs
(Grant NSF MEA-81-144761)
(PB86-154432; NSF/ENG-85048) Avail: NTIS HC A04/MF A01 CSCL 09A

The goal of the project is to develop effective and efficient methods that verify the integrity of printed circuit boards (PCBs) through the use of computer analysis of images. A system for using gray-scale and color images to detect and classify instances of part integrity defects was developed; the use of color imagery to identify color-coded resistors was investigated; and a system for verifying the identity of character-coded dual in-line package markings was developed. Current work in the area of part integrity involves the use of range data acquired with a structured light device. A prototype of a low-cost laser scanner for solder joint imaging has been designed and constructed. A graphical simulator of a much higher performance device was designed. By systematically varying parameters, the conditions under which various kinds of defects become apparent can be analyzed. GRA

N86-25570# Joint Publications Research Service, Arlington, Va.
METHOD OF REDUCING VIBRATIONS IN MACHINES WITH HIGH-SPEED ROTOR ON BALL BEARINGS Abstract Only
V. B. Balmont *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 45 Transl. into ENGLISH from Izvestiya Vysshihk Uchebnykh Zavedeniy: Mashinostroyeniye (Moscow, USSR), no. 6, Jun. 1984 p 28-33 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25571# Joint Publications Research Service, Arlington, Va.
CHARACTERISTICS OF MANIPULATOR FOR INDUSTRIAL ROBOT WITH THREE ROTATIONAL PAIRS HAVING PARALLEL AXES Abstract Only
M. I. Poteyev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 46 Transl. into ENGLISH from Izvestiya Vysshikh Uchebnykh Zavedenii: Mashinostroyeniye (Moscow, USSR), no. 6, Jun. 1984 p 54-57 (For primary document

see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25605# Joint Publications Research Service, Arlington, Va.
HIGH-SPEED HIGH-VOLTAGE AMPLIFIER Abstract Only
A. N. Dyachko, V. N. Ilyushenko, and V. I. Tuyev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 28 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 237-238 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25606# Joint Publications Research Service, Arlington, Va.
MULTICHANNEL RING COMMUTATOR FOR HIGH-CURRENT ACCELERATORS Abstract Only
I. F. Isakov, Ye. I. Logachev, and G. Ye. Remnev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 28-29 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 21-23 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25607# Joint Publications Research Service, Arlington, Va.
HIGH-CURRENT ELECTRON ACCELERATOR Abstract Only
B. V. Alekseyev, I. M. Gorelikov, V. I. Kazurov, L. V. Mashkov, A. G. Greshko, G. I. Soklakov, A. I. Fedorenko, and K. B. Yurekevich *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 29 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 19-21 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25608# Joint Publications Research Service, Arlington, Va.
PLASMATIC ION SOURCE Abstract Only
A. P. Semenov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 30 Transl. into ENGLISH from Plasmatic Ion Source (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 23-24 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25613# Joint Publications Research Service, Arlington, Va.
FATIGUE DEFECT TRANSDUCER AND VALIDATION OF ITS USABILITY Abstract Only
V. T. Troshchenko and V. I. Boyko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 54-55 Transl. into ENGLISH from Problemy Prochnosti (Kiev, USSR), no. 1, Jan. 1985 p 3-8 (For primary document see N86-25599 16-13)
(Rept-1) Avail: NTIS HC A06/MF A01

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N86-25722 British Library Lending Div., Boston Spa (England).
GRAVITATIONAL SEDIMENTATION OF AEROSOL IN DUCTS
T. Tomassini and G. Galluppi 1986 29 p refs Transl. into ENGLISH from Italian article
(BLL-WH-646-(9091.9F); RT/PAS/85/21) Copyright. Avail: British Library Lending Div., Boston Spa, England

The gravitational sedimentation losses are analyzed. An extremely simplified methodology for sedimentation losses calculation in every geometry is shown; this study is important in order to characterize aerosols in ducts and containment systems. Author

N86-25723 ESDU International Ltd., London (England). Engineering Sciences Data Unit.
EJECTORS AND JET PUMPS. DESIGN AND PERFORMANCE FOR INCOMPRESSIBLE LIQUID FLOW
Dec. 1985 98 p refs
(ESDU-85032; ISBN-0-85679-538-0; ISSN-0141-4011) Avail: ESDU

Two procedures are given: a method to obtain an optimum design for a required duty, and a method to predict performance of an existing ejector so as to study the effect of minor changes. The methods are based on one dimensional flow theory, supplemented by empirical correlations for the losses within the nozzles and mixing duct, and the equations are detailed. Extensive design charts are included, and flowcharts guide the user through the simple step-by-step procedures which are illustrated by three detailed practical worked examples. Guidance is provided on the use of annular or multi-nozzle arrangements, various mechanical aspects, and on the avoidance of cavitation. Author

N86-25724# Sandia National Labs., Albuquerque, N. Mex.
ELECTRIC HEATING FOR HIGH-TEMPERATURE HEAT TRANSPORT FLUIDS
J. T. Holmes Dec. 1985 17 p
(Contract DE-AC04-76DP-00789)
(DE86-004975; SAND-85-0379) Avail: NTIS HC A02/MF A01

Recent experiences with electric resistance heaters at the solar Central Receiver Test Facility are described. These heaters are used to preheat or maintain equipment used with molten nitrate salt or liquid sodium heat transfer fluids. Results of extensive testing performed to improve the reliability of similar heating systems used in the development program for the sodium-cooled liquid metal fast breeder nuclear reactor are also reviewed. Recommendations are made for increasing the reliability of trace heating systems for high-melting-point heat transfer fluids including thermal design, heating element selection, installation, insulation, and controls.
DOE

N86-25725# Pacific Northwest Lab., Richland, Wash.
SUPERCRITICAL FLUID METHODS FOR THE ANALYSIS OF COMPLEX FUEL AND ENVIRONMENTAL SAMPLES
R. D. Smith, C. R. Yonker, H. T. Kalinoski, E. K. Chess, H. R. Udseth, S. L. Frye, and B. W. Wright Nov. 1985 28 p refs Presented at the Hanford Life Sciences Symposium, Richland, Wash., 21 Oct. 1985
(Contract DE-AC06-76RL-01830)
(DE86-004868; PNL-SA-13233; CONF-8510225-4) Avail: NTIS HC A03/MF A01

The application of supercritical fluid methods can greatly improve the analysis of complex mixtures spanning wide chemical classes. In separations from complex matrices supercritical fluids can be used to improve both extraction efficiency and speed. The variable solvating powers and gas-like diffusion coefficients and viscosities can provide efficient new methods for sample enrichment, cleanup and fractionation. Supercritical fluid chromatography (SFC) is applicable to both thermally labile and less volatile materials. The use of small diameter (25- to 50-micron) fused silica capillary columns provides chromatographic efficiencies for SFC that are nearly comparable to conventional capillary gas chromatography and much greater than practical by liquid chromatography (LC). The development of practical capillary SFC-MS instrumentation, allowing both electron impact and chemical ionization mass spectrometry (MS), is expected to provide a powerful alternative to LC-MS for complex mixture analysis. Recent results will be presented on the development of methods for the analysis of fuels, labile pollutants, hazardous solid waste materials, and related complex environmental mixtures. The application of various supercritical fluids for sample extraction, SFC and SFC-MS, and the recent development of a system for automated supercritical fluid extraction-chromatography will also be described. Finally, the potential role of supercritical fluid methods in routine chemical analysis will be discussed. DOE

N86-25726*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THERMOMECHANICAL DESIGN CRITERIA FOR CERAMIC-

COATED SURFACES
R. L. Mullen (Case Western Reserve Univ., Cleveland, Ohio.), J. Padovan (Akron Univ., Ohio.), M. J. Braun, B. T. F. Chung, G. McDonald, and R. C. Hendricks 1986 27 p refs Proposed for presentation at the 6th CIMTEC World Congress on High Tech Ceramics, Milan, Italy, 23-28 June 1986; sponsored by the Italian Ministry for Science and Technology, ENEA and American Ceramic Society
(NASA-TM-87328; E-3002; NAS 1.15:87328) Avail: NTIS HC A03/MF A01 CSCL 20D

Some early history of ceramic applications is presented. Finite element modeling of components to determine service and fabrication loads found inelastic behavior and residual stresses to be significant to component life. Inelastic behavior mitigates peak strains but enhances residual strains. Results of furnace, Mach 0.3 burner, and engine tests are discussed and categorized into design criteria (loading, geometry, fabrication, materials, analysis, and testing). These design rules and finite element analyses are brought to bear on two test cases: turboshaft engine seals, and rocket thrust chambers. Author

N86-25727*# National Aeronautics and Space Administration, Washington, D.C.
PROPAGATION OF DETONATIONS IN HYDRAZINE VAPOR
H. J. Heinrich Sep. 1985 21 p refs Transl. into ENGLISH from Zeitschrift fuer Physikalische Chemie, Neue Folge, Vol. 42, 1964 p 149-165 Transl. by The Corporate Word, Inc., Pittsburgh, Pa.
(Contract NASw-4006)
(NASA-TM-77922; NAS 1.15:77922) Avail: NTIS HC A02/MF A01 CSCL 20D

In the range of greater hydrazine vapor pressure, detonation speed depends exclusively on the extent of the ammonia decomposition in the second reaction stage. As vapor pressure decreases, the ammonia disintegration speed becomes increasingly slower and the reaction reached in the reaction zone increasingly decreases until finally, in the vapor pressure range between 53 and 16 Torr, the contribution of the second stage to detonation propagation disappears, and only the first stage remains active. Since the disintegration speed of the hydrazine in this pressure range has decreased markedly as well, no level, but rather only spinning, detonations occur. Temporary separations of the impact front and the reaction zone in the process lead to fluctuations of the detonation speed. Author

N86-25728*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE CONSTRUCTION AND USE OF DIVERGENCE FREE VECTOR EXPANSIONS FOR INCOMPRESSIBLE FLUID FLOW CALCULATIONS Final Report
Nessan Mac Giolla Mhuiris Apr. 1986 22 p refs Submitted for publication
(Contract NAS1-17070)
(NASA-CR-178100; ICASE-86-20; NAS 1.26:178100) Avail: NTIS HC A02/MF A01 CSCL 20D

For incompressible fluids the law of mass conservation reduces to a constraint on the velocity vector, namely that it be divergence free. This constraint has long been a source of great difficulty to the numericist seeking to discretize the Navier-Stokes and Euler equations. A spectral method is discussed which overcomes this difficulty. Its efficacy is demonstrated on some simple problems. The velocity is approximated by a finite sum of divergence free vectors, each of which satisfies the same boundary conditions as the velocity. Projecting the governing equation onto the space of inviscid vector fields eliminates the pressure term and produces a set of ordinary differential equations that must be solved for the coefficents in the velocity. The pressure can then be recovered if it is needed. Author

N86-25729# Virginia Polytechnic Inst. and State Univ., Blacksburg.
TEMPORAL AND SPATIAL GROWTH OF SUBHARMONIC DISTURBANCES IN FALKNER-SKAN FLOWS M.S. Thesis
Fabio P. Bertolotti Jun. 1985 65 p refs
(Contracts N00014-83-K-0089; N00014-84-K-0093)
(AD-A163512) Avail: NTIS HC A04/MF A01 CSCL 20/4

Careful experiments on boundary layer transition conducted in low turbulence wind tunnels have resolved three stages in the breakdown of laminar flow into turbulence: in the first stage, two-dimensional oscillations, commonly referred to as TS waves, appear and propagate in the direction of the flow; in the second stage there appears a rapid three-dimensional deformation of the oscillatory flow; and in the brief third stage high frequency, small scale, quasi-random fluctuations appear and quickly lead the flow into turbulence. The recent analysis of the second stage based on a secondary instability mechanism arising from a parametric resonance induced by the TS wave has given results in quantitative agreement with experimental observations. Using this approach, Herbert had studied the phenomenon in plane channel flow and in a Blasius boundary layer. This thesis studies the effect of pressure gradients on the behavior of secondary instabilities, by extending Herbert's analysis to the Falkner-Skan family of profiles, and develops a spatial formulation for disturbance growth to exactly match the experimentally observed behavior. Author (GRA)

N86-25730# Wisconsin Univ., Madison.
A STATISTICAL ANALYSIS OF THE EFFECT OF FREESTREAM TURBULENCE OF THE BLASIUS BOUNDARY LAYER Technical Summary Report
Thomas J. Bridges and Philip J. Morris Oct. 1985 56 p refs
(Contract DAAG29-80-C-0041; Grant NSF DMS-82-10950)
(AD-A163606; MRC-TSR-2882) Avail: NTIS HC A04/MF A01 CSCL 20/4

This paper considers the flow past a flat plate. When the flow is uniform the Blasius boundary layer forms on the plate. Herein the usual uniform free stream is perturbed by a small amplitude field of random three-dimensional turbulence. Using a numerical technique the statistical response in the boundary layer due to the turbulence in the free stream is computed in terms of auto- and cross-correlation functions. The field variables are expended in finite Chebyshev series and the space-time correlations of these functions are found by forming correlation matrices with the vectors of random coefficients of the Chebyshev expansions. The main result of the evaluations is the fact that three dimensional random infinitesimal free stream turbulence produces a fully three dimensional response in the boundary layer. The excited field includes the presence of streamwise vorticity as well which was previously thought to be due to secondary instability. GRA

N86-25731# Wisconsin Univ., Madison. Mathematics Research Center.
DEGENERATE SYSTEMS OF CONSERVATION LAWS Technical Summary Report
Blake Temple Sep. 1985 14 p refs
(Contract DAAG29-80-C-0041; Grant NSF DMS-82-10950)
(AD-A163621; MRC-TSR-2868) Avail: NTIS HC A02/MF A01 CSCL 20/4

This document describes systems of conservation laws with the property that shock and rarefaction curves coincide. It gives new examples of such systems. These systems isolate and separate many nonlinear aspects of shock waves. The author believes that analytical techniques which handle problems of uniqueness, continuous dependence or convergence of finite difference schemes in these systems, would isolate components in a corresponding analysis required for general systems of conservation laws. GRA

N86-25732# Wisconsin Univ., Madison. Mathematics Research Center.
LP-STABILITY FOR THE STRONG SOLUTIONS OF THE NAVIER-STOKES EQUATIONS IN THE WHOLE SPACE Technical Summary Report
H. BeiraodaVeiga and P. Secchi Oct. 1985 13 p
(Contract DAAG29-80-C-0041)
(AD-A163631; MRC-TSR-2881) Avail: NTIS HC A02/MF A01 CSCL 20/4

We consider the motion of a viscous fluid filling the whole space R3, governed by the classical Navier-Stokes equations (1).

Existence of global (in time) regular solutions for that system of non-linear partial differential equations, is still an open problem. From either the mathematical and the physical point of view, an interesting property is the stability (or not) of the (eventual) global regular solutions. Here, we assume that v1(t,x) is a solution, with initial data a1(x). For small perturbations of a1, we want the solution v1(t,x) being slightly perturbed, too. Due to viscosity, it is even expected that the perturbed solution v2(t,x) approaches the unperturbed one, as time goes to + infinity. This is just the result proved in this paper. To measure the distance between v1(t,x) and v2(t,x), at each time t, suitable norms are introduced (LP-norms). For fluids filling a bounded vessel, exponential decay of the above distance, is expected. Such a strong result is not reasonable, for fluids filling the entire space. GRA

N86-25733# Wisconsin Univ., Madison. Mathematics Research Center.
NOTE ON LOSS OF REGULARITY FOR SOLUTIONS OF THE 3-D INCOMPRESSIBLE EULER AND RELATED EQUATIONS Technical Summary Report
Petre Constantin Nov. 1985 25 p
(Contract DAAG29-80-C-0041; Grant NSF MCS-82-01599)
(AD-A163632; MRC-TSR-2884) Avail: NTIS HC A02/MF A01 CSCL 20/4

One of the central problems in the mathematical theory of turbulence is that of breakdown of smooth (indefinitely differentiable) solutions to the equations of motion. In 1934 Leray advanced the idea that turbulence may be related to the spontaneous appearance of singularities in solutions of the 3-D incompressible Navier-Stokes equations. The problem is still open. This report shows that breakdown of smooth solutions to the 3-D incompressible slightly viscous (i.e., corresponding to high Reynolds numbers, or highly turbulent) Navier-Stokes equations cannot occur without breakdown in the corresponding solution of the incompressible Euler (ideal fluid) equation. It is proven then that solutions of distorted Euler equations, which are equations closely related to the Euler equations for short term intervals, do breakdown. Author (GRA)

N86-25734# Wisconsin Univ., Madison. Mathematics Research Center.
FLOW OF VISCOELASTIC FLUIDS BETWEEN PLATES ROTATING ABOUT DISTINCT AXES Technical Summary Report
K. R. Rajagopal, M. Renardy, Y. Renardy, and A. S. Wineman Nov. 1985 28 p
(Contract DAAG29-80-C-0041; Grants NSF MCS-82-15064; NSF DMS-84-51761)
(AD-A163700; MRC-TSR-2887) Avail: NTIS HC A03/MF A01 CSCL 20/4

We discuss the flow of BKZ fluids in an orthogonal rheometer. Some analytical results are proven, and numerical solutions are obtained for the Currie model. These solutions show a boundary layer behavior at high Reynolds numbers and the possibility of discontinuous solutions or nonexistence at high Weissenberg numbers. GRA

N86-25735# Wisconsin Univ., Madison. Mathematics Research Center.
ON THE SHORE SINGULARITY OF WATER WAVES. PART 1: THE LOCAL MODEL Technical Summary Report
R. E. Meyer Oct. 1985 36 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-82-15064)
(AD-A163707; MRC-TSR-2872) Avail: NTIS HC A03/MF A01 CSCL 20/4

The nonlinear equations governing inviscid water waves close to shore over beaches of small slope are discussed to elucidate their scope, limitations and ramifications. Their decisive feature is a singularity of the differential equations themselves, and to open the way for analysis, an associated problem is formulated in terms of singular wave equations. The emphasis is on the identification of the questions of oceanographical relevance that can be asked and the ways in which they can be posed to construct the basis for a corrrect, mathematical analysis and for its application to shoaling predictions. GRA

N86-25736# Wisconsin Univ., Madison. Mathematics Research Center.
ON THE TWO-DIMENSIONAL PERIODIC SURFACE WAVES OCCURRING IN RECTANGULAR VESSELS: THEORY VERSUS EXPERIMENT Technical Summary Report
Thomas J. Bridges Oct. 1985 78 p refs
(Contract DAAG29-80-C-0041; Grant NSFDMS-82-10950)
(AD-A163708; MRC-TSR-2878) Avail: NTIS HC A05/MF A01 CSCL 20/4

This paper is a four part dialectic between theory and experimental observations and measurements of two dimensional periodic surface waves in a vessel of rectangular cross section. The first two parts consist of minor contributions to the existing theory and experimental measurements of elliptic (deep water) standing waves and the (shallow water) travelling hydraulic jump. A new theory is proposed in the third part which explains the transition from the elliptic standing wave to the hyperbolic traveling hydraulic jump. The result is a family of standing cnoidal waves. To lowest order the solution is composed of two non-interacting periodic progressive cnoidal waves travelling in opposite directions. At higher order the two wave trains interact but the interaction produces nothing of qualitative significance except when the cnoidal standing wave of highest amplitude is considered. This family of waves is validated by experimental observation in part four. In addition in part four observation of compound cnoidal standing waves leads to a conjecture about a sequence of continuous wave forms in parameter space leading from the linear sinusoidal wave to the travelling hydraulic jump. GRA

N86-25737# Wisconsin Univ., Madison. Mathematics Research Center.
SOME REMARKS ON THE NAVIER-STOKES EQUATIONS WITH A PRESSURE-DEPENDENT VISCOSITY Technical Summary Report
Michael Renardy Nov. 1985 16 p refs
(Contract DAAG29-80-C-0041; Grants NSF MCS-82-15064; NSF DMS-84-51761)
(AD-A163726; MRC-TSR-2886) Avail: NTIS HC A02/MF A01 CSCL 20/4

In most mathematical treatments of the Navier-Stokes equations, it is assumed that the viscosity is a constant. Viscosities of real fluids, however, depend not only on the temperature, but may also change significantly with pressure, in particular at high pressures. In this paper, the mathematical consequences of such a prssure dependence are investigated. It is found that, in contrast to the ordinary Navier-Stokes equations, ellipticity can be lost, and the equations are not necessarily well-posed. The complementing condition for traction boundary conditions is investigated, and an existence theorem for the initial boundary value problem with prescribed velocities on the wall is proved. One of the main differences to ordinary Navier-Stokes theory lies in the elimination of the pressure, which now leads to a nonlinear elliptic partial differential equation instead of Laplace's equation. GRA

N86-25738# New York Univ., New York. Inst. of Mathematical Science.
COMPUTATIONAL TECHNIQUES FOR SHOCK WAVE DIFFRACTION PROBLEMS Final Report, 1 Oct. 1982 - 30 Sep. 1985
James Glimm 2 Jan. 1986 8 p refs
(Contract DAAG29-83-K-0007)
(AD-A163776; ARO-19717.11-MA) Avail: NTIS HC A02/MF A01 CSCL 20/4

The front tracking method has been shown to be correct and useful for a range of gas dynamics problems containing shock waves, slip lines, material boundaries and detonation waves. Validation tests compared to laboratory experiment, analytic solutions and independently validated numerical computations shows this method to be correct. Several definitive successes, both theoretical and numerical, have been achieved as part of this effort. Classification of two dimensional elementary waves and

a correct formulation of the two dimensional Riemann problems were first achieved under this contract. Models for curved detonation fronts were studied, to find wave speed dependence on front curvature. This was a major open problem in the modeling of detonation waves. Computations of many elementary wave interactions were tested, including the Mach triple point, regular reflection, and the shock-contact interactions of two basic types. Detailed validation of density contours was made possible because of the high quality experimental data available. Certain interactions between tracked waves, leading to bifurcation of wave topology, were completed. GRA

N86-25739# Toronto Univ. (Ontario). Inst. for Aerospace Studies.
TABULAR AND GRAPICAL SOLUTIONS OF REGULAR AND MACH REFLECTIONS IN PSEUDO-STATIONARY FROZEN AND VIBRATIONAL-EQUILIBRIUM FLOWS. PART 2 Interim Report
T. C. J. Hu and M. Shirouzu Jun. 1985 259 p refs
(Contract DNA001-83-C-0266; Grant AF-AFOSR-0096-82)
(AD-A164047; UTIAS-283-Pt-2; AFOSR-85-1231TR) Avail: NTIS HC A12/MF A01 CSCL 20/4

Part 2 contains additional graphics for AD-A164 046 and two appendices: actual sidewall pressure histories and numerical results; and computer-program listing for the analytical solution of regular and Mach reflections. GRA

N86-25740# Calspan Advanced Technology Center, Buffalo, N.Y.
RESEARCH ON TURBINE FLOWFIELD ANALYSIS METHODS Final Report, 1 Apr. 1983 - 30 Nov. 1984
William J. Rae Jan. 1985 112 p refs
(Contract F49620-83-C-0096)
(AD-A164070; CALSPAN-7177-A-3; AFOSR-85-1220TR) Avail: NTIS HC A06/MF A01 CSCL 20/4

This report contains a description of conformal mapping procedures that can be used to generate computational grids for turbomachinery flowfield calculations, and to determine the incompressible potential flow on such a grid. The mapping procedures represent an extension of the Ives transformation to blade rows having a high solidity. The flowfield solution takes advantage of the fact that one of the mapping steps takes the blade row into a unit circle; by writing down the classical source/sink/vortex solution in this circle, it is possible to find the incompressible potential flow in the original cascade. This solution is of interest in its own right, and provides a useful initial condition for iterative or time marching calculational method. GRA

N86-25741# Naval Postgraduate School, Monterey, Calif.
REVIEW, IMPLEMENTATION AND TEST OF THE QAZ1D COMPUTATIONAL METHOD WITH A VIEW TO WAVE ROTOR APPLICATIONS M.S. Thesis
Thomas F. Salacka Dec. 1985 118 p refs
(AD-A164125; NPS67-85-012) Avail: NTIS HC A06/MF A01 CSCL 20/4

The QAZ1D method is redeveloped in detail and implemented in a first order, one-dimensional FORTRAN program, EULER-1. The program is tested on the shock tube problem and results are presented for various computational meshes and initial conditions. Based on good results of the EULER-1 code, recommendations are made for future extensions and testing to validate the suitability of the QAZ1D method for wave rotor applications. GRA

N86-25742# Naval Postgraduate School, Monterey, Calif.
TWO-DIMENSIONAL HEAT CONDUCTION IN METAL, FLUID COMPOSITES M.S. Thesis
Michael A. Gomori Dec. 1985 89 p refs
(AD-A164127) Avail: NTIS HC A05/MF A01 CSCL 13/1

Because the size and weight of main propulsion and auxiliary systems are inversely proportional to the ease in which heat or energy is exchanged, a major thrust of the research and development program of the U.S. Navy is toward the design and development of equipment that perform at higher efficiency with a reduction in size and weight. In particular, one area of great interest is the reduction in size and weight of steam condensers. The heat-transfer effectiveness is governed by the amount of surface and the overall resistance to the flow of heat. Filmwise condensation of steam on externally-finned tubes is a very complex process. Recent experiments have shown that enhancement ratios (ratio of steam-side heat-transfer coefficient to that of a smooth tube having the same diameter) exceeded the area enhancement produced by the fins. Moreover, the enhancement ratios for fully flooded tubes exceed the values predicted by a simple, one-dimensional conduction model by a factor of 2 to 4. A new two-dimensional conduction model was developed, which showed that the one-dimensional model overpredicted the two-dimensional results for high conductivity tube-metals such as copper by as much as 13%. The two-dimensional model also showed that variations in fin thickness or spacing can result in an overprediction by the one-dimensional model of the two-dimensional results by as much as twenty-two percent. GRA

N86-25743# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DYNAMIC RESPONSE OF FLUID TRANSMISSION LINES M.S. Thesis
Stephen J. McKenna Sep. 1985 172 p refs
(AD-A164354; AFIT/GAE/AA/85S-1) Avail: NTIS HC A08/MF A01 CSCL 13/7

The theoretical predictions of the dynamic response of circular cross section pneumatic transmission lines were compared with experimental results. Tests were conducted in blocked line situations as well as in both laminar and turbulent mean flow conditions. The lines used in the study were 24 in. in length with inside diameters of 0.041, 0.119, and 0.195 in. Tests were conducted over the frequency range 20 to 1000 Hz and over a range of mean flow Reynolds number from 0 to 16000. Theoretical solutions were obtained from computer simulations using a laminar flow model and two turbulent flow models. These models were developed from the Navier-Stokes equation and include components to account for viscosity and radial heat transfer in the fluid. An examination of the turbulent models was conducted based on a nondimensional frequency and attentuation. This led to modification of one of the turbulent models to include a frequency dependent term in the conductance. The effect of flow conditions upstream of the test line and the effect of orifice design on the dynamic response were studied. Experimental results showed good agreement with results of earlier studies. The use of a bypass device upstream of the test line was found to have no effect on line response. GRA

N86-25744# Naval Postgraduate School, Monterey, Calif.
EXPERIMENTAL INVESTIGATION OF A THRUST AUGMENTING EJECTOR M.S. Thesis
Wiradimadja Hidayat Dec. 1985 51 p refs
(AD-A164473) Avail: NTIS HC A04/MF A01 CSCL 20/4

An ejector is basically a jet pump in which the kinetic energy of the jet is made to impart motion to the fluid surrounding it. During this process,in a well designed system,the ejector as a whole experiences a thrust much higher than that of the jet alone. In principle, an ejector is nothing but a jet surrounded by a shroud. This investigation concerns the performance of a two-dimensional ejector with its primary jet excited by a novel method. A constant area duct was used in this experiment. The velocity of the jet at the exit was subsonic. Maximum thrust was obtained when the ejector to jet exit area ratio was about 35. Under this condition a thrust augmentation ratio of 1.65 was achieved, with the jet excited at 20 Hz, whereas without excitation it was only 1.40. The mixing characteristics of the jet under excitation was examined using flow visualization techniques. Smoke filaments illuminated by a sheet of powerful light and schlieren optics with the jet heated were used. Excitation of the jet was found to generate large vortex-like flow structures which might be responsible for enhanced mixing. These vortices extended to considerable distances on both sides of the jet. GRA

N86-25745# Army Cold Regions Test Center, APO Seattle, Wash. 98733.

CONSTITUTIVE RELATIONS FOR A PLANAR, SIMPLE SHEAR FLOW OF ROUGH DISKS
Hayley H. Shen and Mark A. Hopkins Dec. 1985 25 p refs
(AD-A163147; CRREL-85-20) Avail: NTIS HC A02/MF A01 CSCL 20/4

Stresses developed in a rapid, simple shear flow of disks are quantified. Collisional momentum transfer is considered to be the dominant stress generating mechanism. The disks are inelastic and frictional. The restitution coefficient and the coefficient of friction together determine the transfer of momentum and dissipation of energy during a collision. The frictional coefficient generates and maintains a rotational motion of disks. The total fluctuation motion of disks consists of two translational modes and one rotational mode. The rotational mode is found to depend on both the restitution and the friction coefficient. Equipartitions of energy among all modes of motion is absent. The mean rotation, however, depends only on the mean flow gradient. The analysis assumes a constant magnitude for all fluctuation modes. Comparison with a computer simulated disk flow shows good agreement. This implies that the distribution of velocity magnitude may not be crucial to the quantification of stresses. GRA

N86-25746# Mississippi State Univ., Mississippi State. Engineering Industrial Research Station.
PREDICTION OF TURBULENT SKIN FRICTION FOR TWO-DIMENSIONAL, RIB-TYPE SURFACE ROUGHNESS USING A DISCRETE ELEMENT APPROACH Final Report, May 1984 - Aug. 1985
Robert P. Taylor, B. K. Hodge, and Hugh W. Coleman Sep. 1985 35 p refs
(Contract F33615-84-K-3014)
(AD-A163165; TFD-85-1; AFWAL-TR-85-3091) Avail: NTIS HC A03/MF A01 CSCL 20/4

A discrete element model for turbulent flow over two-dimensional rib-type roughness is developed and validated. Surface roughness blockage effects and form drag are included as a constituent part of the differential equations. Separation and reattachment of the flow over rib roughness are identified as the dominant flow phenomena, and models are developed which incorporate the separated region geometry into the blockage. The form drag model is based on the pressure difference between the windward and leeward forces of the roughness. Predictions are compared with a variety of data sets. These comparisons indicate that the discrete element approach can be successfully applied for rib-type roughness. However, the model has a more narrow range of application for different surface geometries than the very broad range which has previously been demonstrated for three-dimensional, distributed roughness. GRA

N86-25747# Arizona State Univ., Tempe. Dept. of Mechanical and Aerospace Engineering.
FAILURE ANALYSIS OF A SODIUM, INCONEL 617 HEAT PIPE Final Report, Jun. 1984 - Mar. 1985
Dean L. Jacobson and J. H. Wang Sep. 1985 31 p
(Contract F33615-81-C-2058)
(AD-A163177; AFWAL-TR-85-2064) Avail: NTIS HC A03/MF A01 CSCL 13/11

A 4.57-meter (15-foot) sodium heat pipe, Inconel 617, was examined following failure. The sodium was exposed to the atmosphere following initial testing. Testing was resumed following attempts to reprocess the sodium by high-temperature outgassing. The pipe failed with intergranular cracks which completely penetrated the heat pipe wall leaking sodium to the atmosphere. Carbide precipitates and some grain boundary impurities were found in the cracked regions, which, along with the oxygen-contaminated sodium, embrittled the material. Thermal gradient-produced stresses during start-up coupled with embrittled grain boundaries appears to have resulted in the failure of the Inconel 617 sodium heat pipe. Author (GRA)

N86-25748# Arizona State Univ., Tempe. Dept. of Mechanical and Aerospace Engineering.
FAILURE ANALYSIS OF A SODIUM HEAT PIPE WITH INTEGRAL LITHIUM FLUORIDE THERMAL ENERGY STORAGE Final Report, Jun. 1984 - Mar. 1985
Dean L. Jacobson and P. Soundararajan Sep. 1985 30 p
(Contract F33615-81-C-2058)
(AD-A163184; AFWAL-TR-85-2063) Avail: NTIS HC A03/MF A01 CSCL 13/11

A sodium, 321 stainless steel heat pipe with three filled Nb-1Zr tubes for thermal energy storage with 304 S.S. screen for wicking was thermal cycled to failure and then an analysis was performed to examine the failure. It was concluded that insufficient weld depth between an end cap and tube body permitted the propagation of a crack through a possible combination of thermal/corrosion failure, creep rupture of the end cap. A number of possible scenarios for the process following a leak are discussed. GRA

N86-25749# Los Alamos National Lab., N. Mex.
LOW-TEMPERATURE HEAT TRANSFER BY CONTACT IN VACUO AND THERMAL CONDUCTIVITY OF KAPTON
S. L. Wipf 1985 5 p Presented at the 9th International Conference on Magnet Technology, Zurich, Switzerland, 9 Sep. 1985
(Contract W-7405-eng-36)
(DE86-002393; LA-UR-85-2943; CONF-850920-8) Avail: NTIS HC A02/MF A01

Heat transfer between copper surfaces separated by insulators, especially Kapton, has been measured. At 5 K, the copper/Kapton interface conductance is C = 2.5 + or - 0.8 kWm(-2)K(-1) and the thermal conductivity is k = 10 + or - 2 mWm(-1)K(-1) being inversely proportional to temperature. For mica both C and k are larger, k at least by two orders of magnitude. DOE

N86-25750# Oak Ridge National Lab., Tenn.
RESEARCH AND DEVELOPMENT ON HEAT PUMPS FOR SPACE CONDITIONING APPLICATIONS: PROCEEDINGS OF THE DOE/ORNL HEAT PUMP CONFERENCE
V. A. Jacobs, ed. and R. H. Powell, Jr., ed. Aug. 1985 269 p Conference held in Washington, D.C., 10 Dec. 1984
(Contract DE-AC05-84OR-21400)
(DE86-002984; CONF-841231) Avail: NTIS HC A12/MF A01

This conference was planned to provide information on current activities in the US Department of Energy (DOE) and Oak Ridge National Laboratory (ORNL) Building Equipment Research (BER) Program. It was primarily for the benefit of HVAC equipment manufacturers and other interested parties, including utilities, independent research and development organizations, universities, other government groups, and research funding and management organizations. The technical presentations were grouped into two principal subject areas: electric systems and thermally activated systems. Electric-system topics included field performance studies, laboratory experiments on cycling performance, analytical estimates of the benefits of variable capacity and zone control, nonazeotropic refrigerant mixtures, ground-coupled systems, and an analysis of Stirling-cycle heat pumps. In the area of thermally activated heat pumps, presentations centered on the development of absorption systems, Stirling-engine-driven systems, and a linear, free-piston IC-engine compressor. Separate abstracts have been prepared for 27 presentations for inclusion in the Energy Data Base. DOE

N86-25751 Wisconsin Univ., Madison.
INCOMPRESSIBLE VISCOUS STEADY FLOW IN CHANNELS AND PIPES Ph.D. Thesis
Gerardo Alberto Ache 1985 179 p
Avail: Univ. Microfilms Order No. DA8519747

Several topics relating to numerical solutions of flow of an incompressible viscous fluid in channels and pipes are considered. The fundamental equations governing such flows are the steady incompressible Navier-Stokes equations. The following topics are considered. An exponential decay estimate is proved for an energy functional for perturbations of Poiseuille flow in a semi-infinite cylinder. Eigenvalues governing the decay for such perturbations are computed. A two-point boundary value approach is used to solve the resulting system of ordinary differential equations yielding efficient and accurate calculations. Boundary conditions are derived

for flows in channels and axisymmetric flows in pipes. These are demonstrated in computations for channels with a step and for pipes with a sudden enlargement of the cross section. The numerical results show the effectiveness of these boundary conditions. Finally a method is presented for treating the pressure singularity at re-entrant corners which occur in both of the test problems. The numerical method is shown to accurately model the singularity at the corner. Dissert. Abstr.

N86-25530# Joint Publications Research Service, Arlington, Va.
STABILITY CHARACTERISTICS OF SUPERSONIC BOUNDARY LAYER AND THEIR RELATION TO TRANSITION POINT BETWEEN LAMINAR AND TURBULENT FLOW Abstract Only
V. I. Lysenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 75 refs Transl. into ENGLISH from Izv. Sibirksogo Otd. Akad. Nauk SSSR: Ser. Tekh. Nauk (USSR), no. 4, iss. 1, Mar. 1985 p 79-86 Original language document was announced in IAA as A85-42123 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

N86-25535# Joint Publications Research Service, Arlington, Va.
CIRCULATION FLOW AT FORWARD SURFACE OF A SPHERE IN A SUPERSONIC WAKE-TYPE STREAM Abstract Only
Yu. P. Golovachev and N. V. Leontyeva *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 87-88 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhanika Zhidkosti i Gaza (USSR), no. 3, May-Jun. 1985 p 143-148 Original language document was announced in IAA as A85-44787 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

N86-25566# Joint Publications Research Service, Arlington, Va.
MODERN ULTRASONIC FLOWMETERS Abstract Only
V. M. Gurevich and S. G. Truman *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 41-42 Transl. into ENGLISH from Sovremennyye Ultrazvukovyye Rashodomery (Moscow, USSR), 1984 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25584# Joint Publications Research Service, Arlington, Va.
SUPERSONIC FLOW ABOUT CONE WITH INJECTION OF GAS THROUGH ITS SURFACE DESCRIBED BY POWER LAW Abstract Only
A. M. Antonov and v. A. Zakrevskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) date p 56 Transl. into ENGLISH from Doklady Akademii Nauk Ukrainskoy SSR, Seriya A: Fiziko-Matematicheskiye i Tekhnicheskiye Nauki (Kiev, USSR), no. 8, Aug. 1984 p 31-35 Original language document was announced in IAA as A85-10465 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25586# Joint Publications Research Service, Arlington, Va.
TRANSIENT SCATTERING OF PLANE ACOUSTIC PRESSURE BY PIECEWISE-HOMOGENEOUS PLATE Abstract Only
V. A. Galazyuk *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 77 Transl. into ENGLISH from Doklady Akademii Nauk Ukrainskoy SSR, Seriya A: Fiziko-Matematicheskiye i Tekhnicheskiye Nauki (Kiev, USSR), no. 11, Nov. 1984 p 25-29 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-26100# Joint Publications Research Service, Arlington, Va.
FINAL STAGE OF DEGENERACY OF TURBULENT VELOCITY FIELD IN WAKE STREAM Abstract Only
I. I. Kovalev, B. A. Kolovandin, and N. N. Luchko *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 10 Transl. into ENGLISH from Inzhenerno-Fizicheskiy Zhurnal (Minsk, USSR), v. 49, no. 2, Aug. 1985 p 209-214 Original language document was announced in IAA as A85-46247 (For primary document see N86-26099 16-70)
Avail: NTIS HC A06/MF A01

N86-26117# Joint Publications Research Service, Arlington, Va.
PROPAGATION OF SHOCK WAVES THROUGH PETROLEUM SUSPENSIONS Abstract Only
K. V. Mukuk, S. M. Makhkamov, and Kh. Kh. Azizov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 8 Transl. into ENGLISH from Izvestiya Akademii Nauk Uzbekskoy SSR: Seriya Tekhnicheskikh Nauk (Tashkent, USSR), no. 4, Jul. Aug. 1985 p 50-52 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26153# Joint Publications Research Service, Arlington, Va.
TEMPERATURE DIAGNOSIS OF A MIXTURE OF MOLECULAR GASES HEATED BY CW CO-2 LASER Abstract Only
R. Aleksandresku, F. V. Bunkin, B. S. Luklyamchuk, Y. Mikhaylesku, Ye. A. Morozova, and G. A. Shafeyev *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 54 Transl. into ENGLISH from Preprint no. 223, Institut Obshchey Fiziki, Laboratoriya Volnovykh Yavleniy, Academy of Sciences (USSR), Moscow, USSR, 1984 Preprint no. 223, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation,* and *19 Spacecraft Instrumentation.*

N86-25752* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
FLUID FLOW METER FOR MEASURING THE RATE OF FLUID FLOW IN A CONDUIT Patent
Paul R. White, inventor (to NASA) Issued 25 Feb. 1986 8 p Filed 4 Apr. 1985 Sponsored by NASA
(NASA-CASE-MFS-28030-1; US-Patent-4,572,004;
US-Patent-Appl-SN-719799; US-Patent-Class-73-861.58) Avail: US Patent and Trademark Office CSCL 14B

A tube fluid flow rate meter consists of a reservoir divided by flexible diaphragm into two separate isolated compartments. The incoming and outgoing tubes open into the compartments. The orifice is sized to allow maximum tube fluid flow. Opposing compression springs are secured within the two compartments on opposite sides of the orifice to maintain orifice position when the tube fluid pressure is zero. A tapered element is centered in, and extends through the orifice into the compartment, leaving an annular opening between the element and the perimeter of the oriface. The size varies as the diaphragm flexes with changes in the tube fluid pressure to change the fluid flow through the opening. The light source directs light upon the element which in turn scatters the light through the opening into the compartment. The light detector in the compartment senses the scattered light to generate a signal indicating the amount of fluid. B.G.

N86-25753* National Aeronautics and Space Administration. Pasadena Office, Calif.
DISCHARGE CELL FOR OPTOGALVANIC SPECTROSCOPY HAVING ORTHOGONAL RELATIONSHIP BETWEEN THE PROBE LASER AND DISCHARGE AXIS Patent
Christopher R. Webster, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) Issued 29 Apr. 1986 12 p Filed 30 Nov. 1983 Sponsored by NASA
(NASA-CASE-NPO-16271-1; US-Patent-4,585,344;
US-Patent-Appl-SN-556514; US-Patent-Class-356-311;
US-Patent-Class-356-318) Avail: US Patent and Trademark Office CSCL 14B

A method and apparatus for an optogalvanic spectroscopy

system are disclosed. Orthogonal geometry exists between the axis of a laser probe beam and the axis of a discharge created by a pair of spaced apart and longituduinally aligned high voltage electrodes. The electrodes are movable to permit adjustment of the location of a point in the discharge which is to irradiated by a laser beam crossing the discharge region. The cell dimensions are selected so that the cross section of the discharge region is substantly comparable in size to the cross section of the laser beam passing orthogonally through the discharge region.
Official Gazette of the U.S. Patent and Trademark Office

N86-25754# Lawrence Livermore National Lab., Calif.
CALIBRATION AND CHARACTERIZATION OF BAYARD-ALPERT GAUGES OPERATING IN HIGH MAGNETIC FIELDS
W. L. Pickles and A. L. Hunt Nov. 1985 17 p Presented at the 32nd National Vacuum Symposium, Houston, Tex, 19-22 Nov. 1985 Sponsored by Lawrence Livermore National Lab., Calif. Submitted for publication
(Contract W-7405-eng-48)
(DE86-003477; UCRL-93596; CONF-851174-19) Avail: NTIS HC A02/MF A01

Standard Bayard-Alpert gauges have been successfully operated for several months in the 0.3 to 0.7 T magnetic fields near the plasma edge of the Tandem Mirror Experiment-Upgrade (TMX-U). The gauges clearly measure gas pressure and maintain calibration within 10% during operation. The gauge filaments are tungsten and are heated with dc. The gauge housing allows operation in the low density plasma outside the limiter radius by thermalizing the neutral gas that enters the gauge and by preventing plasma from entering the gauge. Changing the orientation of the gauge with respect to the magnetic field changes the gauge calibration, or effective sensitivity, by as much as a factor of 100. Only some orientations of the filament collector plane with respect to the magnetic field direction allow calibrated operation as a pressure gauge. This range of angles is approximately from 20 to 50 degrees. The gauge is oriented to produce the desired sensitivity, then calibrated for the magnetic field effects for that position. The correction to sensitivity for magnet field is not strongly species dependent. The gauge species sensitivities for CH4, Xe,and Kr measured in the high magnetic fields were found to be close to the published values measured in no magnetic field. DOE

N86-25755# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
DEVELOPMENT OF AN INTERFEROMETER FOR NATURAL CONVECTION ENHANCEMENT RESEARCH, 1 JANUARY-31 DECEMBER 1984
M. Bohn, E. M. Fisher, and R. Anderson Dec. 1985 43 p
(Contract DE-AC02-83CH-10093)
(DE85-016895; SERI/PR-252-2598) Avail: NTIS HC A03/MF A01

Natural convection heat transfer from vertical storage walls and absorbing surfaces plays an important role in delivering solar energy throughout a passively heated or cooled building. In many building geometries the heat transfer at these surfaces can limit performance of the building. Insufficient heat transfer can cause overheating of attached sunspaces and oversizing of the glazed/absorber area, directly increasing cost. If the natural convection coefficient could be increased simply, overheating could be reduced and system costs could be reduced. This report describes progress in developing an instrument for investigating boundary layers on vertical heated surfaces subjected to disturbances. The instrument, a Mach-Zehnder interferometer, is a standard tool used to investigate natural flows because it is nonintrusive, gives flow visualization capabilities, and gives quantitative information on temperature distribution and heat flux. DOE

N86-25756# National Bureau of Standards, Gaithersburg, Md. Temperature and Pressure Div.
THERMOMETER CALIBRATION: A MODEL FOR STATE CALIBRATION LABORATORIES Final Report
Jacquelyn A. Wise and Robert J. Soulen, Jr. 1986 93 p refs
(NBS-MONO-174; LC-85-600636) Avail: NTIS HC A05/MF A01

The means by which a state calibration laboratory can establish a calibration service based on liquid-in-glass thermometers is described. Discussed are: ice-point baths, controlled-temperature baths, thermometer inspection, calibration techniques, and control chart procedures. Author

N86-25757*# Tennessee Univ. Space Inst., Tullahoma. Gas Dynamics Div.
DEVELOPMENT OF A NEW INSTRUMENT FOR DIRECT SKIN FRICTION MEASUREMENTS Final Report
A. D. Vakili and J. M. Wu Mar. 1986 32 p refs
(Grant NAG1-303)
(NASA-CR-176818; NAS 1.26:176818; UTSI-86-02) Avail: NTIS HC A03/MF A01 CSCL 14B

A device developed for the direct measurement of wall shear stress generated by flows is described. Simple and symmetric in design with optional small moving mass and no internal friction, the features employed in the design eliminate most of the difficulties associated with the traditional floating element balances. The device is basically small and can be made in various sizes. Vibration problems associated with the floating element skin friction balances were found to be minimized due to the design symmetry and optional damping provided. The design eliminates or reduces the errors associated with conventional floating element devices: such as errors due to gaps, pressure gradient, acceleration, heat transfer, and temperature change. The instrument is equipped with various sensing systems and the output signal is a linear function of the wall shear stress. Dynamic measurements could be made in a limited range and measurements in liquids could be performed readily. Measurement made in the three different tunnels show excellent agreement with data obtained by the floating element devices and other techniques. B.G.

N86-25758# Naval Research Lab., Washington, D. C.
CHARACTERIZATION AND CALIBRATION OF FOUR HIGH ENERGY LASER CALORIMETERS Interim Report
G. L. Hall and R. B. Brown 23 Dec. 1985 22 p refs
(AD-A163507; NRL-8933) Avail: NTIS HC A02/MF A01 CSCL 14/2

Four spherical heat sink calorimeters were built for monitoring laser power in the Navy High Energy Laser Program. An extensive study was made to characterize the transfer of energy from a 90 kW lamp to one of the calorimeters. This characterization was then used in the calibration of all four. The standard deviations of the data indicate the precision of the calorimeters is within 2%, with the probable error in the accuracy of the calibrations within 5%. Calibrations calculated from the physical properties of the materials used in the calorimeters are within 5%, indicating that this is also a valid method of calibration. Details on the character of the response of the calorimeters are given in the report, and operating instructions are included. GRA

N86-25759# Naval Postgraduate School, Monterey, Calif.
MEASUREMENTS AND DESIGNS RELATED TO ELECTRICAL SPRAY MODIFICATION IN A T-56 COMBUSTOR Contractor Report, Aug. 1984 - Sep. 1985
Zeev Shavit Dec. 1985 58 p refs
(AD-A164292; NPS67-85-012CR) Avail: NTIS HC A04/MF A01 CSCL 17/8

A new optical technique for measuring Sauter Mean Diameter changes of a fuel spray under an electrostatic field was checked, calibrated, and implemented. The optical technique is based on measuring scattered light at two angles using a variable focal length apparatus. Special attention was given to improving the electrical control loop parameters in order to minimize measurement errors. In order to measure more realistically the effects of the electrostatic probe inside a gas turbine combustor, a pressure chamber was added to the outlet of the present combustion simulation device. Hot tests were carried out with diesel fuel DF-2. Pressure chamber, combustor's temperatures, fuel, and air mass flow rates, were recorded together with the voltage applied at the electrode. Results of the cold tests with the new optical device show a Sauter Mean Diameter of 50.0 micron at fuel pressure

(DF-2) of 100 psi, 51.7 micron at 125 psi and 47.8 micron at 80 psi. The device could not resolve changes while the high voltage field was exerted. Combustion temperatures within the pressure chamber are presented. Preliminary designs for improvements of the various devices are also described. GRA

N86-25760# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A LASER FEEDBACK CONTROL DESIGN FOR PASSIVE RING LASER GYROS IN A VERY HIGH FINESSE CAVITY M.S. Thesis
Mark A. Lorenz Dec. 1985 114 p refs
(AD-A164309; AFIT/GE/ENG/85D-24) Avail: NTIS HC A06/MF A01 CSCL 20/10

The Frank J. Seiler Research Laboratory is currently developing a Passive Resonant Ring Laser Gyroscope (PRRLG) enclosing 58 sq m for proposed use in testing high precision rate sensors and for possibly validating the Theory of General Relativity. The sensitivities required for such experiments are in the 10 to the minus 7th power to 10 to the minus 10th power Earth Rate Unit (ERU) range. This high sensitivity necessitates the use of a large, high finesse cavity. In dealing with high finesse cavities new considerations arise. For example, the cavity linewidth is narrower than linewidths of commercially available stabilized He-Ne lasers. The stability of the laser then becomes the limiting factor in the performance of the PRRLG because of the increased signal-to-noise ratio that arises in this situation. In addition, high finesse cavities exhibit photon lifetimes on the order of 10 to the minus 3rd power to 10 to the minus 6th power seconds, which limits the bandwidth of practical controllers. In this research, a PRRLG was constructed in which a He-Ne laser was frequency locked to 25,000 finesse, 169 sq. cm. resonant cavity, as opposed to the more traditional technique of locking the resonant condition of the cavity to the laser frequency. GRA

N86-25761# Naval Postgraduate School, Monterey, Calif.
InP:Fe AND GaAs:Cr PICOSECOND PHOTOCONDUCTIVE RADIATION DETECTORS M.S. Thesis
Phillip J. Keipper Dec. 1985 123 p refs
(AD-A164413) Avail: NTIS HC A06/MF A01 CSCL 18/4

The dark current, impulse and square-pulse response measurements of photoconductive devices fabricated from two different types of materials, Gallium Arsenide with Chromium dopant (GaAs:r) and Indium Phosphide with Iron dopant (InP:Fe) are reported. These devices have been subjected to irradiation from the S-band Electron Linear Accelerator (LINAC) with an energy of 100 MeV at room temperature. Fluence ranged between 10 to the 13th power and 10 to the 16th power electrons/sq cm. Dark current decreases with increasing fluence for the GaAs:Cr devices whereas InP:Fe shows an increase in the dark current. Both types of materials exhibit extremely fast impulse response after the irradiation. Electron mobility, drift velocity and response speed decrease with increasing fluence. Response speeds of < 100 ps are achieved by fast carrier relaxation in the semiconductor due to the introduction of trapping and recombination centers resulting from the irradiation damage. The GaAs:Cr, unlike the InP:Fe, more closely follows the longer square-pulse exhibiting non nonlinearity. All results are consistent with previously investigated neutron irradiated devices. GRA

N86-25762# Defence Research Establishment, Ottawa. (Ontario).
THE MODIFICATION AND APPLICATION OF A TWO-COLOUR DISAPPEARING-FILAMENT PYROMETER TO PERFORM FLAME TEMPERATURE MEASUREMENTS
Frank D. Findlay Aug. 1985 30 p
(AD-A164456; DREO-TN-85-27) Avail: NTIS HC A03/MF A01 CSCL 21/2

An optical pyrometer of the disappearing-filament type was modified to allow brightness temperature measurements to be made in the green region of the spectrum. The modified instrument was re-calibrated at a wavelength of 547 nm. The manufacturer's calibration of a second pyrometer operating at lambda = 645 nm was verified. Sources of error in the calibrations are discussed. The theory and limitations of two-color pyrometry as a means of obtaining true source temperatures are presented. GRA

N86-25763# Department of the Army, Washington, D. C.
PIEZOELECTRIC RESONATORS USING LATERAL FIELD EXCITATION Patent Application
Arthur Ballato, inventor (to Army) Filed 30 Jan. 1986 38 p refs
(AD-D012165; US-Patent-Appl-SN-823975) Avail: NTIS HC A03/MF A01 CSCL 09/1

Briefly, the objects of the invention are provided in accordance with a piezoelectric crystal resonator element preferably comprised of doubly rotated cuts of piezoelectric material including quartz, aluminum phosphate, lithium tantalate or lithium niobate which uses lateral field excitation and further includes an improved body geometry having recessed electrode regions adjacent a relatively raised piezoelectric region formed on at least one, but preferably both major faces or surfaces of a piezoelectric crystal element. The basic configuration of the piezoelectric element may be either a plate-like shape (plano) or a contoured shape with a plano-convex profile or a convex-convex profile. The convex-convex and plano-convex configurations tend to enhance the energy trapping phenomenon. Single or double mesas are formed on the element with electrode regions of lesser thickness formed thereon adjacent the respective mesa or horizontal channels of a predetermined depth formed in the element with electrodes of a lesser or equal depth being fabricated there in. Additionally, curved edges at the electrode-crystal interfaces are included to reduce field gradients as well as tapered electrodes which have the effect of increasing the energy trapping produced in the area of the crystal between the electrodes. GRA

N86-25764# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Inst. Services Div.
A STATIC ANALYSIS OF ERRORS IN TRANSDUCER CALIBRATION TECHNIQUES USED FOR BLAST PHENOMENA TESTS Final Report, Nov. 1983 - Jan. 1984
Falih Ahmad Sep. 1985 100 p
(AD-A163172; WES/TR-O-85-1) Avail: NTIS HC A05/MF A01 CSCL 14/2

Strain gage transducers are commonly used in the formation of measurement circuits for recording different physical phenomena such as acceleration, displacement, pressure, etc. One method of rating used in these circuits is the shunt resistor calibration technique, which is considered both satisfactory and reliable. A mathematical model representing the static measurement circuit is used to study the effect of major parameters on the calibration procedure. Three parameters are considered: the length of the cable which connects the transducer to the rest of the measurement circuit elements, the nonlinear characteristic of the transducer, and the balanced potentiometer setting. The main advantage gained from this investigation is the improvment in measurement accuracy. Author (GRA)

N86-25765# Department of the Army, Washington, D. C.
ELECTROLYTIC PRESSURE TRANSDUCTION SYSTEM Patent
Gordon H. Bryant, inventor (to Army) Issued 31 Dec. 1985 6 p
Supersedes AD-D011847
(AD-D012102; US-Patent-4,561,450; US-Patent-Appl-SN-657438; US-Patent-Class-128-780) Avail: US Patent and Trademark Office CSCL 06/12

This invention is directed to a Wheatstone bridge circuit for measuring pressure in the distal esophageal sphincter (D.E.S.) as well as in other organs and bodily cavities. A flexible hollow tube having three spaced electrodes is lodged in the esophagus. The tube is partly filled with a saline solution to cover the electrodes, thereby producing two series connected, pressure sensitive resistors. The electrolytic resistors are coupled to two series connected fixed resistors to complete the bridge circuit. Electrical imbalances in the bridge circuit are measured in terms of the pressure corresponding to the pressure applied by the D.E.S.GRA

N86-25766# Department of the Air Force, Washington, D.C.
SURFACE TENSION SCREEN FAILURE DETECTION METHOD

AND APPARATUS Patent
James R. Fenwick, inventor (to Air Force) and Yi M. Chang, inventor (to Air Force) Issued 17 Dec. 1985 6 p
(AD-D012104; US-Patent-4,558,597; US-Patent-Appl-SN-688853; US-Patent-Class-73-600) Avail: US Patent and Trademark Office CSCL 16/4

Apparatus for detecting failure of a surface tension screen disposed between a holding chamber and a main chamber of a tank includes a fixture for supporting the tank in desired test orientations, a drive mechanism on the fixture for rotating the tank and an ultrasonic transducer was in making a measurement with respect to the position of an interface between liquid and gas contained in the holding chamber of the tank. The holding and main chambers are tandemly arranged along a longitudinal axis of the tank and are each substantially filled by a liquid propellant with respective volumes of gas contained in each chamber. The fixture supports the tank in a first orientation with a nose of the tank pointing downwardly and tank longitudinal axis extending approximately 60 deg above horizontal and to the right of vertical and in a second orientation with the tank nose pointing upwardly and tank longitudinal axis extending approximately 60 deg above horizontal and to the left of vertical. Separate measurements are made after rotation of the tank in each of these orientations. These measurements are indicative of the volumes of gas in the holding chamber at the respective orientations. Comparison of the measurements provides an assessment of the integrity of the surface tension screen. If the measurements are significantly different, then this indicates that gas leakage has taken place across the screen and that the screen has therefore failed. Author (GRA)

N86-25767# Department of the Navy, Washington, D. C.
NUCLEAR MAGNETIC RESONANCE GYROSCOPE Patent
Francis A. Karwacki, inventor (to Navy) Issued 1 Oct. 1985 11 p
(AD-D012105; US-Patent-4,544,891; US-Patent-Appl-SN-453014; US-Patent-Class-324-304) Avail: US Patent and Trademark Office CSCL 17/7

A nuclear magnetic resonance gyroscope which derives angular rotation from the phases of precessing nuclear moments utilizes a single-resonance cel situated in the center of a uniform dc magnetic field. The field is generated by current flow through a circular array of coils between parallel plates. It also utilizes a pump and readout beam and associated electronics for signal processing and control. Encapsulated in the cell for sensing rotation are odd isotopes of Mercury Hg199 and Hg201. Unpolarized intensity modulated light from a pump lamp is directed by lenses to a linear polarizer. The linearly polarized light is reflected by another mirror to the cell transverse to the field and orthogonal to the pump lamp light. The linear light after transversing the cell strikes an analyzer where it is converted to an intensity-modulated light. The modulated light is detected by a photodiode processed and utilized as feedback to control the field and pump lamp excitation and readout of angular displacement. Author (GRA)

N86-25768# Department of the Navy, Washington, D. C.
MANCHESTER DECODER CLOCK MULTIPLIER Patent
Aldan D. Gomez and Edward W. Gennetten, inventors (to Navy) Issued 23 Apr. 1985 17 p
(AD-D012127; US-Patent-4,513,329; US-Patent-Appl-SN-528386; US-Patent-Class-360-42) Avail: US Patent and Trademark Office CSCL 09/4

The circuit comprises a differentiator, two a clock decoder, a data flip-flop unit, and a multiphase and frequency logic circuit. The differentiator checks the incoming Manchester encoded signal and divides it into two trigger signals one with data associated with logic O transitions within the Manchester signal and the second trigger signal containing data associated with logic 1 transitions with the Manchester data. One trigger signal is fed to one the nonretriggerable-gated-monostable-multivibrator and the other trigger signal is transmitted to the second similar unit. Within these monostable multivibrator units the signals are a plurality of delayed signals which have waveforms built upon the occurrence of transitions within the Manchester signal associated with the logic O and logic I occurrences. Also within the monostalbe multivibrator, a set/reset latch is utilized to create appropriate signals to aid the control gates in blocking out undesired portions of the input trigger signals from the differentiator. The outputs of the set/reset latches are then fed to a clock decoder and onto a data flip-flop unit which is used to retrieve the data signals from the Manchester encoded signal. Outputs from the tapped delay lines within each monostable multivibrator which emit a plurality of delayed signals are fed to a multiphase and frequency logic unit which combines these delayed signals in a predetermined manner. GRA

N86-25769# Department of the Navy, Washington, D. C.
ACTIVE CIRCULATOR GYROTRON TRAVELING-WAVE AMPLIFIER Patent
J. Mark Baird, Larry R. Barnett, and Yue Ying Lau, inventors (to Navy) Issued 19 Nov. 1985 11 p
(AD-D012128; US-Patent-4,554,483; US-Patent-Appl-SN-537474; US-Patent-Class-315-4) Avail: US Patent and Trademark Office CSCL 09/1

An RF cyclotron maser type traveling-wave amplifier including an integral active circulator is described. It includes a tapered interaction waveguide having a cross-section which gradually increases from a small first end to a larger second end. The waveguide is capable of supporting first and second orthogonal polarization modes with approximately the same propagation characteristics for the two modes. A beam of mildly relativistic electrons having helical electron motion is directed into the small first end to axially propagate within the waveguide toward the larger second end. A tapered magnetic field is generated within the waveguide in a direction approximately parallel to the axis of the waveguide. An input electromagnetic wave in the first polarization mode is launched into the larger second end of the waveguide to propagate toward the first end. The input wave is reflected by the constriction of the tapered waveguide to propagate with the electron beam in the waveguide. The reflected input wave additionally excites energy in the second mode which also co-propagates with the electron beam. The first and second modes are amplified by the electron beam; the second polarization mode being amplified to a greater extent than the first mode. The two orthogonal modes are easily separated to provide input and output ports for the amplifier. GRA

N86-25770# Department of the Air Force, Washington, D.C.
WIDE ANGLE OPTICAL TRANSMITTER/RECEIVER Patent
Raymond C. Hedin and Fred G. Hewitt, inventors (to Air Force) Issued 17 Dec. 1985 5 p
(AD-D012133; US-Patent-4,559,445; US-Patent-Appl-SN-538879; US-Patent-Class-250-203) Avail: US Patent and Trademark Office CSCL 17/2

A novel optical transmitter/receiver device is described which comprises a source of radiation providing a collimated coherent light beam, such as a laser beam, along a first optical axis; a magneto-optic light detector device controllably deflecting the beam off the first optical axis in the direction of a target; optical beam expander and collimating lenses transmitting the expanded beam toward the target and receiving the expanded and reflected beam from the target; the reflected beam then being deflected back along the first optical axis to a scraper mirror which optically turns the reflected beam along a viewing axis toward a photo detector. GRA

N86-25771# Los Alamos National Lab., N. Mex.
DIAMOND ANVIL CELLS: A NEW TOOL FOR HIGH PRESSURE STUDIES
R. D. Taylor 1985 4 p Presented at the Raymond and Beverly Sackler Distinguished Lectures, Tel Aviv, Israel, 5 May 1985
(Contract W-7405-eng-36)
(DE86-002384; LA-UR-85-3546; CONF-8505211-2) Avail: NTIS HC A02/MF A01

Literally hundreds of papers have appeared in the last few years covering a myriad of uses of the diamond anvil cells. The cresendo shows no signs of abating. Static pressures as high as

1.8 megabar were reported. Still higher pressures appear possible. Measurements were made at dilution refrigerator temperatures (less than 50 millikelvins) and to temperatures over 1000 C in special sample ovens. Obviously these methods cannot be applied to every physics problem, but the limitations of diamond anvil cells are being challenged every day. DOE

N86-25772# National Bureau of Standards, Gaithersburg, Md. Chemical Process Metrology Div.
REPORT ON THE NBS-DOE (NATIONAL BUREAU OF STANDARDS-DEPARTMENT OF ENERGY) MAY 1984 WORKSHOP ON THERMAL METERING Final Report
G. E. Mattingly Nov. 1985 59 p refs Workshop held in Gaithersburg, Md., 21-22 May 1984 Sponsored in part by DOE (PB86-155488; NBSIR-85-3242) Avail: NTIS HC A04/MF A01 CSCL 13A

A workshop on thermal metering (i.e., the flow of steam or of hot or chilled water) was convened in Gaithersburg, MD, May 21 to 22, 1984 to discuss and prioritize flow rate measurement problems and research programs which could lead to improve energy conservation through the development, acceptance, and use of district heating and cooling systems. The workshop brought together 60 attendees whose expertise spanned a broad range of interests. Included were flowmeter manufacturers, meter users, standards personnel, academicians, and consultants. Attendees listed current problem areas and measurement needs in thermal metering, discussed appropriate responses to these needs, and prioritized these according to their perceived potential for impacting thermal metering practices. Leading this list are: paper standards with special emphasis on meter installation requirements, research on two-phase flow and its measurement, two-phase flow technology transfer and information dissemination. GRA

N86-25567# Joint Publications Research Service, Arlington, Va.
PIEZORESONANT PRESSURE SENSORS Abstract Only
L. V. Maleyko, V. V. Malov, A. P. Rudenkov, I. V. Yakovlev, T. B. Ibragimov, V. A. Maglysh, O. F. Migukina, and Pitkevich *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 42 Transl. into ENGLISH from Pribory i Sistemy Upravleniya (Moscow, USSR), no. 9, Sep. 1984 p 19-21 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25568# Joint Publications Research Service, Arlington, Va.
SEALED REED RELAY LIMIT SWITCHES Abstract Only
I. P. Ivanov, G. P. Svintsov, M. A. Yefimova, A. V. Lebedev, and Yu. P. Samsonov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 43 Transl. into ENGLISH from Pribory i Sistemy Upravleniya (Moscow, USSR), no. 9, Sep. 1984 p 17-19 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25569# Joint Publications Research Service, Arlington, Va.
CONTACTLESS POSITION SENSOR Abstract Only
I. I. Popov, G. S. Pyatlina, and Ye. A. Shulyakovskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 43 Transl. into ENGLISH from Pribory i Sistemy Upravleniya (Moscow, USSR), no. 9, Sep. 1984 p 16-17 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25614# Joint Publications Research Service, Arlington, Va.
STABILIZER OF SHAFT ROTATION ANGLE FOR D.C. COMMUTATOR MOTOR Abstract Only
S. N. Nizovoy, F. G. Kulichanov, and N. O. Yelyutin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 55 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 230-231 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25629# Joint Publications Research Service, Arlington, Va.
UNIVERSAL INSTRUMENT FOR ACOUSTIC INSPECTION Abstract Only
Ye. G. Nashuk, V. D. Beshentsev, and A. Sh. Atayev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 75-76 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 242 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25630# Joint Publications Research Service, Arlington, Va.
FIVE-CHANNEL INSTRUMENT FOR ACOUSTIC FLAW DETECTION BY METHOD OF ACOUSTIC EMISSION Abstract Only
A. I. Alabichev, Yu. I. Tyalin, Yu. I. Golovin, A. A. Sletkov, V. I. Uskov, S. A. Gladyshev, and A. N. Bykov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 76 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 243 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25631# Joint Publications Research Service, Arlington, Va.
SYNCHRONIZATION SYSTEM FOR PULSED POWER LASER WITH OPTOELECTRONIC CONTROL Abstract Only
V. V. Appolonov, S. I. Ziyenko, V. V. Brytkov, S. V. Muravyev, and V. A. Yamshchikov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 78 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 163-168 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25633# Joint Publications Research Service, Arlington, Va.
DIAMOND CHAMBER TO STUDY EFFECT OF SHEARING STRAIN ON STRUCTURES AND PROPERTIES OF SOLIDS UNDER PRESSURES UP TO 43 GPa Abstract Only
V. D. Blank, Yu. S. Konyayev, A. I. Kuznetsov, and E. I. Estrin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 81 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 178-180 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25634# Joint Publications Research Service, Arlington, Va.
WIDEBAND PIEZOELECTRIC PRESSURE TRANSDUCER Abstract Only
V. A. Godonyuk, B. V. Zhuravlev, and I. P. Shedko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 83 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 214-217 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25635# Joint Publications Research Service, Arlington, Va.
FURNACE FOR TESTING MATERIALS IN AIR AT TEMPERATURES UP TO 1850 DEG C Abstract Only
V. Ye. Sotnikov, A. M. Smirnitskiy, A. V. Satanovskiy, V. L. Balkevich, and Yu. M. Mosin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 84 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 217-218 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25636# Joint Publications Research Service, Arlington, Va.
DETECTION OF CHARGED-PARTICLE PLUGS IN GASEOUS TARGET BY MEANS OF SEMI-CONDUCTOR-TYPE DETECTORS Abstract Only
G. F. Binko, M. G. Gornov, Yu. P. Dobretsov, -Ugryumov Kirillov, V. G., A. A. Maloletnev, A. L. Mikaelyan, A. P. Pichugin, V. P. Protasov, V. I. Savelyev, A. Ya. Smakov et al *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 86 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 36-40 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-26133# Joint Publications Research Service, Arlington, Va.
APPLICATION OF SCINTALLATION DETECTORS FOR X-RAY DIAGNOSIS OF LASER PLASMA Abstract Only
M. P. Kalashnikov, V. K. Lyapidevskiy, Yu. A. Mikhaylov, V. A. Prorvich, A. V. Rode, A. V. Sartori, G. V. Skilzkov, and S. I. Fedotov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 30 Transl. into ENGLISH from Preprint no. 26, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26146# Joint Publications Research Service, Arlington, Va.
MICROCHANNEL ANALYZER FOR RECORDING PARTICLE AND X-RAY EMISSION FROM LASER PLASMA Abstract Only
L. Z. Barabash, B. N. Bragin, A. A. Golubev, A. I. Gromov, Yu. A. Zakharenkov, V. S. Malysheva, A. I. Nikitenko, A. F. Nikitina, G. V. Ryazanov, and R. T. Khaydarov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 45 Transl. into ENGLISH from Kratkiye Soobshcheniya po Fizike (Moscow, USSR), no. 5, May 1985 p 16-20 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26147# Joint Publications Research Service, Arlington, Va.
MAGNETIC ANALYZER OF HIGH-ENERGY IONS FROM THERMONUCLEAR TARGETS COMPRESSED BY LASER BEAM Abstract Only
A. A. Yerokhin, Yu. A. Zakharenkov, G. V. Sklizkov, and A. S. Shikanov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 46 Transl. into ENGLISH from Kratkiye Soobshcheniya po Fizike (Moscow, USSR), no. 5, May 1985 p 21-24 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

36 LASERS AND MASERS

Includes parametric amplifiers.

N86-25773# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE CONSTRUCTION AND CALIBRATION OF A LADAR (LASER DETECTION AND RANGING) CROSS-SECTION MEASUREMENT RANGE M.S. Thesis
James C. Higgins Dec. 1985 109 p refs
(AD-A163955; AFIT/GEP/ENP/85D-5) Avail: NTIS HC A06/MF A01 CSCL 17/5

The purpose of this thesis was to construct an experiment that can accurately determine a target's laser radar cross-section. A laser radar cross-section (LRCS) is a measure of the average amount of optical power scattered by a target, and is analogous to the term radar cross-section, which is defined for scattered power radiating at microwave wavelengths. Cross-sections, whether optical or microwave, are quantities which describe the effective area of a specific target which directly scatters an incident electromagnetic wavefront. The focus of this thesis is to investigate the nature of LRCS measurements, with particular attention paid to the measurements of spherical calibration targets. GRA

N86-25774# Sigma Tau Standards Corp., Tuscaloosa, Ala.
ADVANCED DESIGN ATOMIC HYDROGEN MASER RESEARCH AND DEVELOPMENT Final Report, 1 Dec. 1982 - 31 Dec. 1985
Harry E. Peters 31 Dec. 1985 43 p refs
(Contract N00014-83-C-2015)
(AD-A164071; STNR-F1) Avail: NTIS HC A03/MF A01 CSCL 20/5

The objectives of this contract were to develop atomic hydrogen masers based upon novel concepts of cavity stabilization and new designs of the maser physics unit to provide improved stability and environmental isolation as well as a reduction in size, weight, cost and power consumption. First, new maser designs were developed which implemented electronic cavity frequency stabilization using the cavity frequency switching technique. These new designs also incorporated a novel cavity assembly which is smaller than that used in past masers and new quadrupole state selectors based upon concepts described in the cited referfences. Then two representative hydrogen masers were constructed and tested and experiments were performed to optimize the electronic systems. GRA

N86-25775# Stanford Univ., Calif. Lab. of Physics.
CONSTRUCTION OF A HIGH ENERGY LINEAR ACCELERATOR FOR RESEARCH IN FREE ELECTRON LASERS, BEAM-WAVE INTERACTIONS, SPECTROSCOPY AND MICROCIRCUITRY FABRICATION Final Report, 1 Aug. 1983 - 31 Jul. 1984
J. M. J. Madey and M. R. Yearian 3 Dec. 1985 12 p refs
(Grant AF-AFOSR-0303-83)
(AD-A164250; AFOSR-85-1221TR) Avail: NTIS HC A02/MF A01 CSCL 20/5

A long pulse, high brightness 45 MeV linear accelerator has been constructed for use as a driver for free electron laser and beam wave experiments, and as the first section of a 1 GeV injector for a high brightness electron storage ring. This contract has led to: (1) demonstration of the highest gradient and longest pulse length yet achieved in a 3 meter S-band SLAC-type travelling wave accelerator section; and (2) demonstration of the high current and high current density attainable through the use of a strong microwave field to replace the dc electric field usually used in linac electron guns. GRA

N86-25776# Naval Research Lab., Washington, D. C.
BASELINE DESIGN OF A 5-7 kJ KrF LASER FACILITY FOR DIRECT ILLUMINATION ICF EXPERIMENTS
R. H. Lehmberg, S. P. Obenschain, and A. J. Schmitt 31 Dec. 1985 46 p refs
(AD-A164280; NRL-MR-5713) Avail: NTIS HC A03/MF A01 CSCL 18/1

This report presents the baseline design for a 48 channel angularly-multiplexed KrF laser system, using amplifier modules similar to those in the AURORA laser at Los Alamos National Laboratory. With output energies of 5-7 kJ, pulsewidths approx. = 5 ns, and broadband (>20 1/cm) capabilities, the proposed system is intended primarily for laser-plasma experiments related to direct-drive inertial confinement fusion. The design incorporates the NRL induced spatial incoherence (ISI) technique into each beam in order to achieve the smoothly-varying and controllable irradiation profiles essential to the direct-drive approach. The option of using stimulated Raman scattering to improve the beam quality prior to the ISI echelons is also discussed. Author (GRA)

N86-25777# SRI International Corp., Menlo Park, Calif. Chemical Physics Lab.
PHOTODISSOCIATION AND PHOTOEXCITATION OF SIMPLE MOLECULES WITH 1576 A f2 LASER
T. G. Slanger and M. R. Taherian 1985 17 p refs
(Contract DAAG29-81-K-0001)
(AD-A164336; ARO-17561.7-CH) Avail: NTIS HC A02/MF A01 CSCL 07/5

The Fluorine laser, operating at 1576 A, is the shortest wavelength laser with which one photon photochemical experiments are currently practical. This paper studies experiments carried out on C2N2 and on NO, the former case involving photodissociation, the latter, photoexcitation. At 1576 A, photodissociation of C2N2 leads to production of CN(A 2Pi) and CN(X2 Sigma(+)), with the CN(A) being produced in a range of vibrational levels, up to the thermodynamic limit of v=5. Radiative lifetimes have been measured for each of the six levels, and the lifetimes become shorter with increasing v, which agrees with theoretical predictions, but with no previous experimental studies. Rates coefficients for quenching the CN(A) state by the parent molecule show a correlation with the size of the energy gap between the A level and the closest lower X level, although the effect is linear and not exponetial in energy. The laser radiation is resonant with a transition in the B'-X band of NO. This results, in the collision-free case, in emission in three band systems, B' and B, whereas upon

He addition, several other band systems appear. We have determined which rotational levels are involved in the initial step, and find the match to be within 0.25/cm of resonance. The branching ratio between the B'-X and B'-B systems has been found to be 155. The resonance between the laser radiation and the NO transition establishes NO as a unique monitor of the laser power. GRA

N86-25778# Naval Weapons Center, China Lake, Calif.
CHARACTERIZATION OF ALUMINUM NITRIDE/ALUMINUM OXIDE REACTIVELY SPUTTERED ANTIREFLECTION COATINGS Final Report, period ending 1984
L. G. Koshigoe, L. F. Johnson, T. M. Donovan, and C. D. Marrs Sep. 1985 40 p refs
(AD-A164494; AD-E900539; NWC-TP-6651) Avail: NTIS HC A03/MF A01 CSCL 20/5

Aluminum nitride/aluminum oxide multilayer protective anti-reflection coatings are being developed for use on laser windows. These materials have been shown to be relatively stable and scratch resistant, thus demonstrating their applicability for this use. Both two- and three-layer coatings were designed at the wavelength of 0.500 micrometer. The design techniques utilized, as well as the resulting transmission spectra, are discussed. GRA

N86-25779# Department of the Navy, Washington, D. C.
OPTICAL INJECTION LOCKING OF LASER DIODE ARRAYS Patent Application
Lew Goldberg, Henry F. Taylor, and Joseph F. Weller, inventors (to Navy) Filed 7 Nov. 1985 19 p refs
(AD-D012164; US-Patent-Appl-SN-795796) Avail: NTIS HC A02/MF A01 CSCL 20/5

Injection locking of a laser array by a single master laser is achieved. A single-lobe far-field pattern and a single mode emission spectrum in the output of the laser array results. GRA

N86-25780# United Technologies Research Center, East Hartford, Conn.
INVESTIGATION OF PLASMA PROCESSES IN ELECTRONIC TRANSITION LASERS Annual Report, 1 Jan. - 31 Dec. 1985
William L. Nighan 15 Dec. 1985 28 p
(Contract N00014-85-C-0259)
(AD-A163141; UTRC/R85-927162-1) Avail: NTIS HC A03/MF A01 CSCL 20/5

This is an investigation of the fundamental processes affecting the operation, performance and application of electrically excited lasers having potential utility in a variety of areas of importance to the Navy. Particular attention is presently focused on the broadband XeF(C is then A) laser, which has the potential for efficient, tunable operation throughout the blue-green spectral region. The research at UTRC is closely coordinated with a complementary ONR-supported experimental program being conducted at Rice University. This Annual Report summarizes recent results of this investigation, and includes reprints of recently published papers in which specific results and conclusions of the research are described in detail: transient absorption in the visible region; rare gas-halide mixture synthesis; efficient XeF(C is then A) laser, tunable visible laser, tunable blue-green laser. GRA

N86-25781# Department of the Air Force, Washington, D.C.
NF(3) COMBUSTOR FOR CYLINDRICAL LASER Patent Application
Walter R. Warren, inventor (to Air Force) Filed 8 Nov. 1985 24 p
(AD-D012088; US-Patent-Appl-SN-796125) Avail: NTIS HC A02/MF A01 CSCL 20/5

A combustor using D2/NF/He (Deuterium, Nitorgen Fluoride, Helium) is used in a laser gain generator in a cylindrical gas laser. The combustor includes a plurality of primary rings having fuel, oxidizer and diluent orifices therein. Fuel and oxidizer orifices form a triplet injector set that provides a reactant set. Two diluent orifices form a diluent injector set that provides a diluent set. These sets alternate about each primary ring and form one primary ring to the adjacent primary. Because the diluent set does not mix directly with the reactant set initially, a greater percentage of lasing products are formed because of the higher temperature in the reacting zone. Diluent is mixed as required at a later stage in the flow. GRA

N86-25782# Department of the Air Force, Washington, D.C.
FIRE CONTROL APPARATUS FOR A LASER WEAPON Patent Application
Richard H. Worsham, inventor (to Air Force) Filed 29 Oct. 1985 49 p
(AD-D012098; US-Patent-Appl-SN-792373) Avail: NTIS HC A03/MF A01 CSCL 19/5

This patent application discloses a laser weapon fire control computer apparatus for responding in real time to the escort/threat scenario that confronts the weapon. The fire control computer apparatus compares the threat data with stored predicted scenarios to develop a firing strategy menu which takes into account the fact that the laser energy is instantaneously propagated to the target but requires a substantial amount of time to inflict damage. The fire control computer apparatus utilizes the weapon's status, dwell time, slow time and fuel limits to yield a weapon pointing sequence and weapon on-off times. GRA

N86-25783# Department of the Air Force, Washington, D.C.
TUBULAR SINGLET DELTA OXYGEN GENERATOR Patent
William E. McDermott, David E. Ellis, Nicholas R. Pchelkin, George W. Miller, and David J. Benard, inventors (to Air Force) Issued 10 Dec. 1985 7 p Supersedes AD-D010414
(AD-D012112; US-Patent-4,558,451; US-Patent-Appl-SN-399567; US-Patent-Class-372-389) Avail: US Patent and Trademark Office CSCL 20/5

This invention relates to high energy chemical lasers and to a system for generating singlet data, energizing molecular gas for use with such lasers. More particularly, this invention concerns itself with an apparatus for generating molecular oxygen in the excited singlet-delta electronic state. In accordance with this invention, it has been found that molecular oxygen in the electronically excited singlet delta state can be generated in an efficient and reliable manner by a generating device which comprises a tubular reaction chamber having a substantially circular cross-section which in turn is positioned within a vacuum chamber. The generating device is then inter-connected to a conventional atomic iodine laser for providing the laser with electronically excited oxygen as one of the reacting components. The laser itself provides the necessary vacuum to evacuate the vacuum chamber of the generating device during its operation. A source of chlorine gas is introduced into the center of one end of the reaction chamber along with liquid mixture of hydrogen peroxide and sodium hydroxide. Suitable control devices control the flow rates of the gas and liquid. GRA

N86-25784# Department of the Navy, Washington, D. C.
SEMICONDUCTOR LASER END-FACET COATINGS FOR USE IN SOLID OR LIQUID ENVIRONMENTS Patent
Graham A. Garcia and Steven J. Cowen, inventors (to Navy) Issued 9 Apr. 1985 4 p
(AD-D012125; US-Patent-4,510,607; US-Patent-Appl-SN-567594; US-Patent-Class-372-49) Avail: US Patent and Trademark Office CSCL 20/5

An improvement for a semiconductor laser allows the facet reflectivity to be modified to compensate for the presence of a liquid or transparent solid medium having an index of refraction n sub m. A first dielectric coating is disposed on an end-facet of the semiconductor laser and has an index of refraction n sub 1. A second dielectric coating is disposed on the first dielectric coating and has an index of refraction n sub 2. The materials of the dielectric coatings are selected such that the fraction (n sub 1)/(n sub 2) = square root of (n sub m). Thus the problems associated with reduction of laser facet reflectivity due to contact with a surrounding medium which optically is very different from air is overcome. GRA

N86-25785# Los Alamos National Lab., N. Mex.
OPTICAL BEAM BENDING AND FOCUSING IN FREE-ELECTRON OSCILLATORS
R. W. Warren 1985 18 p Presented at the 7th International Free-Electron Laser Conference, Tahoe City, Calif., 8 Sep. 1985
(Contract W-7405-eng-36)
(DE86-002426; LA-UR-85-3854; CONF-850956-6) Avail: NTIS HC A02/MF A01

As the bunched electron beam in the wiggler of an FEL oscillates from side to side, it generates a new optical field. This new field is coherent with the old field that entered the wiggler and bears a phase relationship to that field depending upon many variables. If the new field is in phase with the old, optical gain occurs. If it is 90 deg out of phase, the combined fields have a phase shift that represents retardation, that is,a real positive index of refraction. This phase shift generally does not occur uniformly over the cross section of the optical beam, but is concentrated in the center for an aligned system or to one side for a misaligned system. The former case leads to optical beam focusing, the latter to beam bending along with the focusing. An FEL oscillator can be a particularly sensitive arrangement for observing focusing and bending because of the abrupt termination of the macropulse of electrons. This termination triggers a transverse oscillation of the optical pulse that is trapped in the cavity around its equilibrium position. The amplitude of the oscillation can be large. During the Los Alamos oscillator experiment, the bending phenomenon was observed. In this paper we present the results of these observations, a discussion of different models that might be used to explain them, and comparison of the measurements with crude calculations using a final model. DOE

N86-25786# Northwestern Univ., Evanston, Ill. Dept. of Physics and Astronomy.
COHERENT SHORT WAVE RADIATION FROM A SOLID STATE FREE ELECTRON LASER
S. A. Bogacz, J. B. Ketterson, and G. K. Wong Sep. 1985 11 p Presented at the 7th International Free-Electron Laser Conference, Tahoe City, Calif., 8 Sep. 1985 Prepared in cooperation with Argonne National Lab., Ill.
(Contract W-31-109-eng-38)
(DE86-003055; CONF-850956-8) Avail: NTIS HC A02/MF A01

The idea of using a crystal lattice or a superlattice as an undulator for a free electron laser is explored. A purely classical treatment of relativistic positrons channeling through the proposed structure is performed in a self consistent fashion involving the wave equation for the radiating electromagnetic field and the kinetic equation for the positron distribution function. The gain coefficient for a forward radiating field is obtained in closed analytic form and is studied numerically for a (110) planar channeling in Si. This result, combined with a feedback mechanism arising from Bragg diffraction within the basic crystal lattice, may lead to an instability of the radiation inside the crystal. DOE

N86-25787# Los Alamos National Lab., N. Mex.
RECENT ADVANCES IN ULTRAVIOLET LASER TECHNOLOGY
J. F. Figueira, S. R. Foltyn, L. A. Rosocha, R. C. Sze, C. R. Tallman, J. Telle, and D. E. Watkins 1985 16 p Presented at the 2nd Bucharest International Conference on Trends in Quantum Mechanics, Bucharest, Romania, 2 Sep. 1985
(Contract W-7405-eng-36)
(DE86-002404; LA-UR-85-3560; CONF-8509105-1) Avail: NTIS HC A02/MF A01

The science and technology of violet and ultraviolet lasers has matured rapidly in the last five years. High average power lasers have been demonstrated and several commercial product lines are now available. Single pulse devices have successfully demonstrated large output energies in well controlled beams. Some of the current laser development programs are discussed. Research in both discharge pumped lasers and E-beam pumped lasers are discussed, as well as review methods of wavelength conversion in these devices. Finally the current understanding of laser induced damage to optical components in the UV is discussed. DOE

N86-25788# California Univ., Berkeley. Lawrence Berkeley Lab.
PULSED PHOTOTHERMAL DEFLECTION SPECTROSCOPY IN FLOWING MEDIA
V. Zharov and N. M. Amer Jun. 1985 8 p Presented at the 4th International Topical Meetingon Photoacoustic, Thermal and Related Sciences, Quebec, 4 Aug. 1985
(Contract DE-AC03-76SF-00098)
(DE86-002879; LBL-20189; CONF-850886-6) Avail: NTIS HC A02/MF A01

Pulsed photothermal deflection was used to spatially map out flow velocity profiles and to determine absolute flow velocities. DOE

N86-25576# Joint Publications Research Service, Arlington, Va.
HARDENING TREATMENT OF MACHINE PARTS WITH CO2 POWER LASERS Abstract Only
A. S. Borodachev, M. B. Gutman, G. A. Kuznetsov, L. A. Medvedovskaya, and G. K. Rubin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 52 Transl. into ENGLISH from Elektrotekhnika (Moscow, USSR), no. 10, Oct. 1984 p 51-54 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25632# Joint Publications Research Service, Arlington, Va.
APPARATUS WITH TRANSPARENT ANVILS-WINDOWS FOR OPTICAL AND X-RAY ANALYSIS UNDER HIGH PRESSURE Abstract Only
B. A. Fursenko, O. V. Kholdeyev, Yu. A. Litvin, and V. D. Kropachev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 80-81 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 174-178 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-26101# Joint Publications Research Service, Arlington, Va.
SUBSURFACE PLASMA IN BEAM OF CONTINUOUS CO2-LASER Abstract Only
Ye. V. Danytsikov, V. A. Dymshakov, F. V. Lebedev, V. D. Pismennyy, and A. V. Ryazanov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 16 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Seriya Fizicheskaya (Moscow, USSR), v. 49, no. 4, Apr. 1985 p 811-828 (For primary document see N86-26099 16-70)
Avail: NTIS HC A06/MF A01

N86-26102# Joint Publications Research Service, Arlington, Va.
COMPUTER SIMULATION OF PROCESSES IN SOLID-STATE LASER OSCILLATORS AND AMPLIFIERS WITH PHOTOTUBE PUMPING: LASER PUMPING SYSTEMS Abstract Only
V. M. Gradov, G. I. Kromskiy, A. A. Mak, G. V. Sklizkov, S. I. Fedotov, and A. A. Shcherbakov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 42-43 Transl. into ENGLISH from Preprint no. 105, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26099 16-70)
Avail: NTIS HC A06/MF A01

N86-26103# Joint Publications Research Service, Arlington, Va.
CHARACTERISTICS OF X-RADIATION EMITTED DURING FOCUSING OF LASER BEAMS ON SOLID TARGETS: RADIATION LOSSES IN MULTICHARGE PLASMA Abstract Only
V. A. Vinogradov and V. N. Shlyaptsev *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 65 Transl. into ENGLISH from Preprint no. 11, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26099 16-70)
Avail: NTIS HC A06/MF A01

N86-26105# Joint Publications Research Service, Arlington, Va.
COMPUTER SIMULATION OF PROCESSES IN SOLID-STATE LASER RADIATORS AND AMPLIFIERS WITH GLOW-TUBE PUMPING: ELECTRIC-DISCHARGE PUMPING SOURCES.

THERMOPHYSICAL PROCESSES IN ENVELOPE AND ELECTRODES OF PULSE PUMPS Abstract Only
V. M. Gradov, V. I. Zhiltsov, G. V. Sklizkov, Yu. I. Terentyev, S. I. Fedotov, and A. A. Shcherbakov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 88-89 Transl. into ENGLISH from Preprint no. 189, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26099 16-70)
Avail: NTIS HC A06/MF A01

N86-26106# Joint Publications Research Service, Arlington, Va.
COMPUTER SIMULATIONS OF PROCESSES IN SOLID-STATE LASER RADIATORS AND AMPLIFIERS WITH PHOTOTUBE PUMPING: ELECTRIC-DISCHARGE PUMPING SOURCES. ARC DISCHARGES Abstract Only
V. M. Gradov, A. A. Mak, G. I. Kromskiy, G. V. Sklizkov, S. I. Fedotov, and A. A. Shcherbakov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 89 Transl. into ENGLISH from Preprint no. 190, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26099 16-70)
Avail: NTIS HC A06/MF A01

N86-26112# Joint Publications Research Service, Arlington, Va.
MICROWAVE ABSROPTION IN GLASS HEATED BY LASER RADIATION Abstract Only
N. Ye. Kask, M. A. Kovalyev, G. M. Fedorov, and D. B. Chopornyak *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 3 Transl. into ENGLISH from Fizika i Khimiya Stekla (Leningrad, USSR), v. 11, no. 1, Jan.-Feb. 1985 p 68-74 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26113# Joint Publications Research Service, Arlington, Va.
IMPURITY ABSORPTION BY CHALCOGENIDE GLASSES IN CO LASER EMISSION REGION Abstract Only
V. G. Plotnichyenko and V. K. Sysoyev *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 4 Transl. into ENGLISH from Fizika i Khimiya Stekla (Leningrad, USSR), v. 11, no. 1, Jan.-Feb. 1985 p 105-107 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26114# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF DEGRADATION PROCESSES IN ELECTRON-BEAM PUMPED CdS LASERS USING A TRANSMISSION ELECTRON MICROSCOPE Abstract Only
G. V. Bushuyeva, S. A. Pendor, A. N. Pechenov, A. A. Predvoditelev, V. I. Reshetov, and P. V. Shapkin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 4 Transl. into ENGLISH from Preprint no. 65, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26118# Joint Publications Research Service, Arlington, Va.
LASER RADIATION IN ZnSe EXCITED BY GUNN DOMAINS IN STREAMER DISCHARGE CHANNEL Abstract Only
V. D. Dubrov, I. Ismailov, A. Z. Obidin, A. N. Pechenov, and Yu. M. Popov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 10 Transl. into ENGLISH from Kratkiye Soobshcheniya Po Fizike (Moscow, USSR), no. 6, Jun. 1985 p 3-5 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26119# Joint Publications Research Service, Arlington, Va.
THRESHOLD CONDITIONS FOR DAMAGE TO POTASSIUM CHLORIDE SINGLE CRYSTALS EXPOSED TO CW CO-2 LASER RADIATION Abstract Only
A. A. Blistanov, N. M. Voloshinskaya, Ye. P. Glotov, Kh. Z. Bugaidullina, I. A. Zabolotskikh, V. N. Koterov, O. M. Kugayenko, V. V. Sumerin, V. A. Ulyanov, and N. V. Cheburkin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 13 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2389-2396 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26120# Joint Publications Research Service, Arlington, Va.
GENERATION OF FREQUENCY-TUNABLE ULTRASHORT PULSES IN A DYNAMIC DISTRIBUTED FEEDBACK LASER Abstract Only
V. I. Bezrodnyy, Ye. I. Zabello, and Ye. A. Tikhonov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 14 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2438-2442 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26121# Joint Publications Research Service, Arlington, Va.
THEORY OF SURFACE DAMAGE TO NONTRANSPARENT MATERIALS BY LASER RADIATION Abstract Only
A. A. Vedenov, O. P. Ivanov, and A. L. Chernyakov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 15 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2438-2442 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26122# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF THE INFLUENCE OF PUMP PROFILING ALONG THE OPTICAL AXIS ON TELESCOPIC-CAVITY ELECTRO-IONIZATION LASER OUTPUT CHARACTERISTICS Abstract Only
S. S. Kozyuchenok, V. A. Rodichkin, V. P. Tomashevich, and V. F. Shanskiy *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 16 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2461-2464 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26123# Joint Publications Research Service, Arlington, Va.
LASING CHARACTERISTICS OF A POSITIVE ELECTROOPTICAL FEEDBACK NEODYMIUM LASER Abstract Only
A. V. Agashkov and Yu. F. Morgun *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 17 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2465-2470 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26124# Joint Publications Research Service, Arlington, Va.
CHLORINE MONOFLUORIDE-HYDROGEN ELECTRIC DISCHARGE CHEMICAL LASER Abstract Only
V. B. Kolovskiy, S. A. Drobakha, G. P. Zhitneva, G. A. Abakumov, and A. P. Simonov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 17-18 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2507-2509 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26125# Joint Publications Research Service, Arlington, Va.
LASER CAVITIES WITH DIFFRACTION GRATINGS IN AUTOCOLLIMATION MODE Abstract Only
V. N. Beltyugov, V. N. Ochkin, N. N. Sobolev, Yu. V. Troitskiy, and Yu. B. Udalov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 18 Transl. into ENGLISH from Preprint no. 37, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26126# Joint Publications Research Service, Arlington, Va.
POLARIZATION CHARACTERISTICS OF A SECONDARY GAMMA-RAY DURING LIGHT SCATTERING BY RELATIVISTIC ELECTRONS Abstract Only
V. A. Murashova, G. S. Pashchenko, and M. N. Yakimenko *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 19 Transl. into ENGLISH from Preprint no.

3078, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1983 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26127# Joint Publications Research Service, Arlington, Va.
PHYSICAL FACTORS LIMITING SERVICE LIFE OF COPPER BROMIDE LASERS Abstract Only
Nikolay Kirilov Vuchkov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 19 Transl. into ENGLISH from Akademiya Nauk SSSR Institut Obshchey Fiziki Dissertation Abstracts (Moscow, USSR) (For primary document see N86-26108 16-36)
Avail: NTIS HC A05/MF A01

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N86-25789* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SYNCHRONOUSLY DEPLOYABLE TRUSS STRUCTURE Patent
Harold G. Bush, inventor (to NASA), M. Mikulas, Jr., inventor (to NASA), and E. Wallsom, inventor (to NASA) (Kentron International, Inc., Hampton, Va.) 1 Apr. 1986 8 p Filed 30 Nov. 1983 Sponsored by NASA
(NASA-Case-LAR-13117-1; US-Patent-4,578,920;
US-Patent-Appl-SN-556512; US-Patent-Class-52-645;
US-Patent-Class-52-111; US-Patent-Class-52 648;
US-Patent-Class-244-159; US-Patent-Class-244-173;
US-Patent-Cla s-343-881; US-Patent-Class-343-882) Avail: US Patent and Trademark Office CSCL 13I

A collapsible-expandable truss structure, including first and second spaced surface truss layers having an attached core layer is described. The surface truss layers are composed of a plurality of linear struts arranged in multiple triangular configurations. Each linear strut is hinged at the center and hinge connected at each end to a nodular joint. A passive spring serves as the expansion force to move the folded struts from a stowed collapsed position to a deployed operative final truss configuration. A damper controls the rate of spring expansion for the synchronized deployment of the truss as the folded configuration is released for deployment by the restrain belts. The truss is synchronously extended under the control of motor driven spools.
Official Gazette of the U. S. Patent and Trademark Office

N86-25790* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
VARIABLE FRICTION SECONDARY SEAL FOR FACE SEALS Patent
Eliseo DiRusso, inventor (to NASA) Issued 8 Apr. 1986 5 p Filed 16 Nov. 1984 Sponsored by NASA
(NASA-CASE-LEW-14170-1; US-Patent-4,580-791;
US-Patent-Appl-SN-672224; US-Patent-Class-227-27;
US-Patent-Class-227-28) Avail: US Patent and Trademark Office CSCL 11A

Vibration and stability of a primary seal ring is controlled by a secondary seal system. An inflatable bladder which forms a portion of the secondary seal varies the damping applied to this seal ring. The amplitude of vibration of the primary seal ring is sensed with a proximity probe that is connected to a microprocessor in a control system. The bladder pressure is changed by the control system to mitigate any sensed instability or vibration.
Official Gazette of the U. S. Patent and Trademark Office

N86-25791* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LATCHING MECHANISM FOR DEPLOYABLE/RE-STOWABLE COLUMNS USEFUL IN SATELLITE CONSTRUCTION Patent
Elvin L. Ahl, Jr., inventor (to NASA) Issued 6 May 1986 11 p Filed 2 May 1984 Sponsored by NASA
(NASA-CASE-LAR-13169-1; US-Patent-4,587,526;
US-Patent-Appl-SN-606431; US-Patent-Class-343-883;
US-Patent-Class-343-DIG.2; US-Patent-Class-52-110) Avail: US Patent and Trademark Office CSCL 13I

A column longeron latch assembly provides the securing mechanism for the deployable, telescoping column of a hoop/column antenna. The column is an open lattice structure with three longerons disposed 120 deg apart as the principle load bearing member. The column is deployed from a pair of eleven nested bays disposed on opposite sides of a center section under the influence of a motor-cable-pulley system. The longeron latch is a four bar linkage mechanism using the over-center principle for automatically locking the longeron sections into position during deployment. The latch is unlocked when the antenna is to be restowed. A spring pack disposed in the end of each longeron serves to absorb stress forces on the deployed column through the cam head piston and abutting latch from an adjacent longeron. Official Gazette of the U. S. Patent and Trademark Office

N86-25792 Central Electricity Generating Board, London (England). Translations Section - Overseas Service.
OPERATIONAL RELIABILITY OF WELDED T-JOINTS MADE FROM CrMoV STEELS FOR USE IN STEAM LINES
I. I. Chechko, V. A. Garnyk, and V. N. Zemzin 1986 9 p refs Transl. into ENGLISH from Elektricheskie Stantsii (USSR), no. 5, 1975 p 17-19
(BLL-CE-Trans-8140-(9022.09)) Avail: British Library Lending Div., Boston Spa, England

An analysis of the susceptibility to damage of welded T-joints for high-pressure steam lines supplied from various sources shows that the measures adopted by the manufacturers (gradual transition of the seam into the tube metal and examination of the hardness of the metal after heat treatment) has permitted the susceptibility of T-joints to damage to be greatly reduced. The results of further examinations of the welds made for T-joints in steam lines (involving operating times of up to 50,000 hours), and the experience gained in making repair welds under the operating conditions encountered at power stations are given. Author

N86-25793*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
GENERATION OF SPIRAL BEVEL GEARS WITH ZERO KINEMATICAL ERRORS AND COMPUTER AIDED TOOTH CONTACT ANALYSIS
Faydor L. Litvin (Illinois Univ., Chicago.), Wei-Jiung Tsung, John J. Coy, and Charles Heine (Dana Corp., Fort Wayne, Ind.) Mar. 1986 21 p refs Presented at the 2nd World Congress on Gearing, Paris, France, 2-5 Mar. 1986
(Grant NAG3-48)
(NASA-TM-87273; E-2932; NAS 1.15:87273;
USAAVSCOM-TR-86-C-2) Avail: NTIS HC A02/MF A01 CSCL 13I

Kinematic errors in spiral bevel gears are a major source of noise and vibrations in transmissions. A method for the generation of Gleason's spiral bevel gears which provides conjugated gear tooth surfaces and an improved bearing contact was developed. A computer program for the simulation of meshing, misalignment, and bearing contact was written. Author

N86-25794*# National Aeronautics and Space Administration, Washington, D.C.
PROCEEDINGS OF A WORKSHOP ON APPLICATIONS OF TETHERS IN SPACE: EXECUTIVE SUMMARY
William A. Baracat, Compiler 1986 43 p Proc. held in Venice, Italy, 15-17 Oct. 1985
(Contract NASw-3921)
(NASA-CP-2422; NAS 1.55:2422) Avail: NTIS HC A03/MF A01 CSCL 13I

During June 1985, a number of aerospace products developed in Australia were displayed at the Paris Air Show. The Department of Defense was one of the 16 exhibitors, and presented 14 products which were considered to have commercial potential

on the world market. Considerable interest was shown in the Department of Defense products presented in Paris, and subsequent visits to aerospace companies in Israel, for the demonstrated strong overseas interest in both manufacture and purchase of these products. Author

N86-25795# MSNW, Inc., San Marcos, Calif.
PLASMA JOINING OF METAL MATRIX COMPOSITES Interim Report, Oct. - Nov. 1985
G. H. Reynolds and L. Yang Dec. 1985 14 p refs
(Contract DAAG29-85-C-0027)
(AD-A164095; ARO-22817.1-MS-S) Avail: NTIS HC A02/MF A01 CSCL 13/8

Aluminum-reactive metal matrix alloys for Al-SiC composite filler metals are described. Preliminary process modeling studies on constituent vaporization effects, thermochemical stability of surface oxide films, and dissolved gas evolution in-plasma are described. GRA

N86-25796# Amorphous Materials, Inc., Garland, Tex.
LARGE PLATE CdTe SYNTHESIS BY SEALED VESSEL TRANSPORT AD-A164117 HC A03/MF A01 Final Technical Report, Nov. 1984 - Nov. 1985
G. R. Cronin and A. R. Hilton 31 Dec. 1985 38 p refs
(Contract DAAG29-85-C-0004)
(AD-A164117) Avail: NTIS HC A03/MF A01 CSCL 13/8

A crucial problem in the volume production of U. S. Government FLIR systems is the availability of mercury-cadmium-telluride (HgCdTe) detector arrays. The conventional method for preparing CdTe crystals is too slow. The purpose of this program will be to develop an alternative approach. A compounding process originally developed for the preparation of large plates of IR transmitting chalcogenide glass has been applied to cadmium telluride. A three zone furnace system is used to vaporize, condense and compound near stoichiometric quantities of 5-nines grade cadmium and tellurium. A controlled directional freeze results in circular plates up to 25 cm in diameter which are free of voids or gross inclusions and contain large areas of single crystal material. A heat treating process under cadmium and tellurium vapor has been developed which results in a 100 fold improvement in infrared transmission over non heat treated material. Absorption coefficients less than 0.002/cm have been observed from 2.5 micrometers wavelength on samples ranging up to 2 cm in thickness. The attainment of near theoretical transmission, as expected, is dependent upon the sample thickness, anneal temperature, pressure of cadmium or tellurium used in the anneal, and length of time of treatment. Details of the compounding process as well as the annealing process are included in the text. GRA

N86-25797# Carnegie-Mellon Univ., Pittsburgh, Pa. Mobile Robot Lab.
AUTONOMOUS MOBILE ROBOTS Annual Report
Hans P. Moravec 30 Jan. 1986 163 p refs
(Contract N00014-81-K-0503)
(AD-A164404; CMU-RI-MRL-86-1) Avail: NTIS HC A08/MF A01 CSCL 13/6

Since 1981 the Mobile Robot laboratory of the Robotics Institute of Carnegie-Mellon University has conducted basic research in areas crucial for autonomous robots. We have built three mobile robots as testbeds for new concepts in control, vision, planning, locomotion and manipulation. This report recounts our work in 1985. Included are two papers describing two-dimensional sonar mapping and navigation, and a proposal for a three dimensional sonar. Three papers cover recent results in stereo visual navigation - we have achieved a tenfold speedup and a tenfold increase in navigational accuracy over our first generation system, and have a much deeper understanding of some of the mathematical foundations. Three papers describe results in a road navigation task - we are now able to navigate a simple road network at walking speeds with a single color camera on a roving robot using a variety of image processing and navigation methods. Three papers describe aspects of motion control, motors, wheeled kinematics and vehicle dynamics. Two papers present our newest robots, Neptune and Uranus. A final article gives some long-term motivations and expectations for mobile robot research, and the report ends with a bibliography of our publications. Author (GRA)

N86-25798# Department of the Navy, Washington, D. C.
ADJUSTABLE SELF-RELEASING HOOK Patent
William B. Piercy, inventor (to Navy) Issued 27 Aug. 1985 4 p
(AD-D012122; US-Patent-4,537,434; US-Patent-Appl-SN-606011; US-Patent-Class-294-82.31) Avail: US Patent and Trademark Office CSCL 13/3

This patent is for a load lowering hook which is equipped with a spring biased load holding member to eject and disengage the load rigging when the load touches down and the majority of the weight is released. The spring loaded member can be adjusted to disengage the load at a preset weight depending upon the weight of the rigging that will still be pulling on the hook after the load touches down. GRA

N86-25799# Massachusetts Inst. of Tech., Cambridge. Sea Grant College Program.
WIDE BANDWIDTH POSITIONING SYSTEMS FOR SPACE AND UNDERWATER VEHICLES
H. Kazerooni and T. B. Sheridan Jun. 1985 20 p refs
(Grant NA84AA-D-00046)
(PB86-157310; MITSG-85-34) Avail: NTIS HC A02/MF A01 CSCL 13I

Presented is a method for wide bandwidth stiff position control of unmanned underwater and space vehicles. The use of feedback alone may not provide an underwater or a space vehicle sufficient bandwidth with large stiffness. With feedback alone the vehicle may not behave like a stiff platform in the presence of a wide frequency range of disturbances. It is suggested that the vehicle be connected to environmental structures by means of cables or grabbers. These connecting cables will develop dynamic and kinematic constraints on the vehicle motion. This problem led to the development of a method that allows for control of the motion of constrained underwater or space vehicles. This method is called impedance control. The frequency domain essentials of impedance control and a robust controller design method are given. GRA

N86-25800# Massachusetts Inst. of Tech., Cambridge. Marine Industry Advisory Services.
MIT (MASSACHUSETTS INSTITUTE OF TECHNOLOGY) UNDERWATER TECHNOLOGY RESEARCH: TELEMANIPULATOR DEVELOPMENTS (REVISED EDITION)
1 Aug. 1985 20 p refs
(Grant NA84AA-D-00046)
(PB86-157302; MITSG-85-27; OPPORTUNITY BRIEF-40) Avail: NTIS HC A02/MF A01 CSCL 13I

The contents of an MIT report on telemanipulator developments includes the following topics: touch sensing; parallel link manipulator; impedance control of manipulators; underwater teleoperators for space simulation; and development of a supervisory controlled telemanipulator for the ARGO/JASON vehicle system. GRA

N86-25801# Amerind Publishing Co. Pvt. Ltd., New Delhi (India).
DIFFUSION PROCESSES IN SOLID-PHASE WELDING OF MATERIALS
V. M. Falchenko, L. N. Larikov, and V. R. Ryabov 1984 205 p refs Transl. into ENGLISH of the book "Diffuzionnye Protsessy v Tverdoi Faze pri Svarke" Moscow, Mashinostroenie, 1975 Sponsored in part by National Science Foundation, Washington, D.C. Prepared for National Bureau of Standards, Gaithersburg, Md.
(PB86-155025; TT-80-52014) Avail: NTIS HC A10/MF A01 CSCL 13H

Results of experimental and theoretical investigations of the physical processes occurring in the solid phase during welding of metals and alloys are discussed. A detailed examination of the theory as well as experimental data are presented in regard to the following processes: recovery and recrystallization of metals during welding; phase transformations in the zone of the welded joint; self-diffusion and heterodiffusion; the formation and growth of intermetallic layers in welded joints of heterogeneous metals;

and the formation and decay of supersaturated solid solutions in the joint zone. Technological recommendations are offered and conditions for welding suggested. Engineers and technicians working in the fields of welding, metal physics, and physical metallurgy will find the monograph very useful. GRA

N86-25802# General Electric Co., Schenectady, N. Y.
MINOR ELEMENT EFFECTS ON GAS TUNGSTEN ARC WELD PENETRATION Interim Report, 1 Oct. 1983 - 30 Sep. 1984
R. E. Sundell, W. F. Savage, S. M. Correa, D. W. Walsh, and L. P. Harris Mar. 1985 58 p refs Prepared in cooperation with Rensselaer Polytechnic Inst., Troy, N.Y.
(Grant NSF MEA-82-08950)
(PB86-154473; Rept-85SRD008; NSF/ENG-85046) Avail: NTIS HC A04/MF A01 CSCL 13H

The interim report summarizes the work completed during the second contract year to investigate and develop a means to control the influence of minor element concentrations on gas tungsten arc (GTA) weld penetration. Full factorial experiments are in progress to systematically determine the effect of separate alloying trace elements on AISI 8630 low-alloy steel and on Inconel 718. Results, to date, show a strong correlation between sulfur content and an increase in the depth-to-width ratio in the weld head for the low-alloy steel. Author (GRA)

N86-25803# Acurex Corp., Mountain View, Calif. Energy and Environmental Div.
ENVIRONMENTAL ASSESSMENT OF NOx CONTROL ON A SPARK-IGNITED LARGE BORE RECIPROCATING INTERNAL COMBUSTION ENGINE. VOLUME 2: DATA SUPPLEMENT Final Report, Apr. 1980 - Jun. 1981
C. Castaldini Jan. 1986 159 p
(Contract EPA-68-02-3188)
(PB86-156817; ACUREX/TR-81-79/EE-Vol-2;
EPA-600/7-86-002B-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 21G

A compendium of detailed emission and test data from field tests of a large-bore, spark-ignited reciprocating engine and laboratory analyses of collected samples is given. The engine was tested in two operating modes: a baseline (normal) operation, and with increased air/fuel ratio for NOx reduction to levels below the proposed new source performance standard (NSPS) of 700 ppm dry at 15 percent O2. The test data include preliminary equipment calibration, detailed engine operation, and complete exhaust gas emission measurement results. Exhaust gas emission measurements included (in addition to continuous monitoring for criteria gas pollutants) monitoring for volatile hydrocarbons (C1-C6), total organics in two boiling point ranges, organic compound category information, specific quantitation of the semivolatile organic priority pollutants, separation of organic extracts, exhaust gas concentration of trace elements, and biological assays of organic sample extracts. GRA

N86-25804# Acurex Corp., Mountain View, Calif. Energy and Environmental Div.
ENVIRONMENTAL ASSESSMENT OF NOx CONTROL ON A SPARK-IGNITED LARGE BORE RECIPROCATING INTERNAL COMBUSTION ENGINE. VOLUME 1: TECHNICAL RESULTS Final Report, Apr. 1980 - Jun. 1981
C. Castaldini Jan. 1986 112 p
(Contract EPA-68-02-3188)
(PB86-156809; ACUREX/TR-81-79/EE-Vol-1;
EPA-600/7-86-002A-Vol-1) Avail: NTIS HC A06/MF A01 CSCL 21G

Emission results for a spark-ignited, largebore, reciprocating, internal-combustion engine operating both under baseline conditions, and with combustion modification controls to reduce NOx emissions to levels below the proposed new source performance standard (NSPS) for such engines are reported. Exhaust gas measurements included total organics in two boiling point ranges, compound category information within these ranges, specific quantitation of semivolatile organic priority pollutants, flue gas concentrations of 73 trace elements, and particulates. Exhaust NOx emissions were reduced almost 50%, from a baseline level of 1,260 ng/j by increasing the operating air/fuel ratio of the engine. Accompanying the reduction was a slight increase in engine efficiency. The CO, methane, total hydrocarbon, and total semivolatile organic compound emissions were increased from 10 to 65% under low-NOx operation. However, total nonvolatile organic emissions decreased 55%. The organic emissions for both tests consisted primarily of aliphatic hydrocarbons with some carboxylic acids, phenols, and low-molecular-weight fused-ring aromatics. The POMs were detected in concentrations below 4 mg/dcsm. GRA

N86-25805# Acurex Corp., Mountain View, Calif. Energy and Environmental Div.
ENVIRONMENTAL ASSESSMENT OF NOx CONTROL ON A COMPRESSION IGNITION LARGE BORE RECIPROCATING INTERNAL COMBUSTION ENGINE. VOLUME 2: DATA SUPPLEMENT Final Report, Apr. 1980 - Apr. 1981
C. Castaldini Jan. 1986 174 p
(Contract EPA-68-02-3188)
(PB86-155827; ACUREX/TR-81-81/EE-Vol-2;
EPA-600/7-86-001B-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 21G

Emission and test data from field tests of a large-bore, compression-ignition reciprocating engine burning diesel fuel are reported. The engine was tested during two operating modes; at baseline, and with fuel injection retard for NOx emission reduction to levels below the proposed new source performance standard (NSPS) for such engines. The data include preliminary equipment calibration, detailed engine operation, and complete exhaust gas emission measurement results. Exhaust gas emission measurements included monitoring of volatile hydrocarbons (C1-C6), particulates, sulfur oxides, total organics in two boiling point ranges, organic compounds, semivolatile organic priority pollutants, trace elements, and biological assays of organic sample extracts. GRA

N86-25806# Deere and Co., Moline, Ill.
INDUSTRIAL ROTARY ENGINE DEVELOPMENT: APPLICATION OPPORTUNITIES Final Report, Jan. - Nov. 1985
J. D. Guidry Nov. 1985 170 p refs
(Contract GRI-5084-233-1055)
(PB86-153673; GRI-85/0199) Avail: NTIS HC A08/MF A01 CSCL 21G

The study examines the economic feasibility of manufacturing natural gas rotary engines for cogeneration and industrial variable speed applications. Cogeneration and variable speed potential is evaluated by market segment and projected to the year 2000. Market penetrations possible for natural gas rotary are estimated for each market segment. The benefits of manufacturing a natural gas rotary engine for cogeneration and variable speed applications to the energy consumer, to total energy conservation, the gas industry, and the natural gas rotary engine manufacturer are also discussed. The study concludes that total benefits warrant a program to develop a natural gas rotary engine for eventual sale. GRA

N86-25807# Energy and Environmental Analysis, Inc., Arlington, Va.
DIAGNOSTICS FOR EMISSION CONTROL SYSTEM MALFUNCTION ON THREE-WAY CATALYST-EQUIPPED VEHICLES Final Report, Nov. 1983 - Nov. 1985
K. G. Duleep Nov. 1985 339 p
(Contract ARB-A2-047-32)
(PB86-148665; ARB-R-85/265) Avail: NTIS HC A15/MF A01 CSCL 21G

The report presents the results of a two part study. Current manufacturer recommended diagnostic procedures for identifying vehicular emission control malfunctions on three-way catalyst equipped gasoline fueled automobiles were reviewed. Diagnosis of malperformance was limited to the following systems: exhaust gas recirculating, secondary air, fuel, and catalyst. Generalized diagnostic procedures for malfunctioning emission control systems were developed and validated on 52 vehicles. Two mechanics alternatively disabled and repaired the vehicles using the

diagnostic and repair procedures. The report also describes inspection procedures developed for the control of smoke emissions from light-duty diesel vehicles. Two types of procedures were developed, for component testing and for inspection/ maintenance programs. These procedures were validated on six light-duty vehicles. GRA

N86-25808# Massachusetts Univ., Amherst. Dept. of Mechanical Engineering.
ECONOMIC APPLICATIONS OF ASSEMBLY ROBOTS. ECONOMIC ANALYSIS AND CLASSIFICATION SYSTEMS FOR ROBOT ASSEMBLY
Y. S. Ho and G. Boothroyd Feb. 1985 149 p refs
(Grant NSF MEA-81-11917)
(PB86-154465; NSF/ENG-85044; Rept-5) Avail: NTIS HC A07/MF A01 CSCL 13I

The report concerns production costs and focuses on the importance of giving proper consideration to manufacturing and assembly during the part and product design process. Types of robots and robot assembly systems are identified. Part design rules and corresponding classification systems for products to be assembled on these systems are described. Worksheets and equations for the draft design for robot assembly techniques are presented; their use is illustrated; and the effect of product redesign is discussed. A case study is included and a comparison of assembly costs and cycle times for various types of assembly systems is given. Author (GRA)

N86-25809# Massachusetts Univ., Amherst. Dept. of Mechanical Engineering.
ECONOMIC APPLICATIONS OF ASSEMBLY ROBOTS. ECONOMICS OF PRINTED CIRCUIT BOARD ASSEMBLY
J. John and G. Boothroyd Apr. 1985 124 p refs
(Grant NSF MEA-81-11917)
(PB86-154457; NSF/ENG-85045; Rept-6) Avail: NTIS HC A06/MF A01 CSCL 13I

A typical assembly process for printed circuit boards is described. Then, an initial cost model is described with application to a sample printed circuit board to show the high proportion of manual insertion cost relative to the total insertion cost. Next, standard times from industry for manual assembly of printed circuit boards are presented and compared to times from the Design for Assembly Handbook. Factors that make the handbook not applicable to printed circuit board assembly are outlined. Lastly, manual and robotic insertion time and cost for non-standard components on a sample printed circuit board are compared to show the economic feasibility of assembly robots for non-standard component insertion. Author (GRA)

N86-25810# Massachusetts Univ., Amherst. Dept. of Mechanical Engineering.
ECONOMIC APPLICATIONS OF ASSEMBLY ROBOTS. THE DEVELOPMENT OF A PROGRAMMABLE BELT FEEDER FOR HANDLING RECTANGULAR FLAT PARTS IN A ROBOT ASSEMBLY SYSTEM
J. M. Koff and P. Dewhurst Apr. 1985 125 p refs
(Grant NSF MEA-81-11917)
(PB86-153749; NSF/ENF-85043; Rept-4) Avail: NTIS HC A06/MF A01 CSCL 13I

Reprogrammable means of feeding and orienting rectangular parts are discussed. Positioning of sensory devices to determine part orientation is discussed. The development of a feeder that is designed to take randomly oriented rectangular parts and feed them to a specific location in a predetermined orientation is discussed. GRA

N86-25572# Joint Publications Research Service, Arlington, Va.
CONTROLLING MOVEMENT OF MANIPULATOR WITH ALLOWANCE FOR ELASTIC OSCILLATIONS OF ARM Abstract Only
N. N. Bolotnik and A. A. Gukasyan *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 46-47 Transl. into ENGLISH from Mekhanika Tverdogo Tela (Moscow, USSR), no. 4, Jul. - Aug. 1984 p 38-46 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25575# Joint Publications Research Service, Arlington, Va.
SELECTION OF TEST ACCELERATION FACTOR FOR BEARING ASSEMBLIES OF ELECTRICAL MACHINES Abstract Only
O. D. Goldberg, A. G. Gorbunov, and S. V. Muravyev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 51 Transl. into ENGLISH from Elektroteknika (Moscow, USSR), no. 10, Oct. 1984 p 34-36 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25577# Joint Publications Research Service, Arlington, Va.
NEW METHOD OF SYNTHESIZING NOMINAL TRAJECTORY FOR MANIPULATOR ROBOTS WITH REDUNDANT DEGREES OF MOBILITY Abstract Only
M. Vukobratovic and M. Kircanska *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 53 Transl. into ENGLISH from Mashinovedeniye (Moscow, USSR), no. 4, Jul. - Aug. 1984 p 21-25 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25579# Joint Publications Research Service, Arlington, Va.
ENGINEERING DESIGN AND OPTIMIZATION OF RADIAL AEROSTATIC BEARINGS Abstract Only
V. S. Balasanyan and N. Sh. Zhapparov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 54 Transl. into ENGLISH from Mashinovedeniye (Moscow, USSR), no. 4, Jul. - Aug. 1984 p 84-91 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25580# Joint Publications Research Service, Arlington, Va.
DYNAMIC DESIGN OF SLIDING BEARINGS Abstract Only
I. M. Khomenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 55 Transl. into ENGLISH from Vestnik Mashinostroyeniya (Moscow, USSR), no. 8, Aug. 1984 p 9-12 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25581# Joint Publications Research Service, Arlington, Va.
MATCHING HEAD AND CAVITATION CHARACTERISTICS OF TWIN AXIAL (WORM-TYPE) PUMP IMPELLERS Abstract Only
I. V. Shcherbatenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 56 Transl. into ENGLISH from Vestnik Mashinostroyeniya (Moscow, USSR), no. 8, Aug. 1984 p 12-14 (For primary document see N86-25556 16-31)

N86-25582# Joint Publications Research Service, Arlington, Va.
INTEGRAL METHOD OF CALCULATING LOADS ON BEARINGS IN GEAR-TYPE ROTARY PUMPS WITH LIMITED WORKING SPACE Abstract Only
E. I. Rudoy and A. G. Garkusha *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 56 Transl. into ENGLISH from Vestnik Mashinostroyeniya (Moscow, USSR), no. 8, Aug. 1984 p 15-17 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25583# Joint Publications Research Service, Arlington, Va.
EFFECT OF UNDERCOATING BY HEAT AND AIR BLAST TREATMENT ON TRIBOLOGICAL CHARACTERISTICS OF SOLID LUBRICANT IN STEEL FRICTION PAIRS Abstract Only
Z. S. Rubsova, L. N. Sentyurikhina, G. A. Protasov, and V. I. Lopukhin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 57 Transl. into ENGLISH from Vestnik Mashinostroyeniya (Moscow, USSR), no. 8, Aug. 1984 p 26-27 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25610# Joint Publications Research Service, Arlington, Va.
CHARACTERISTICS OF SOLAR CELLS WITH SCHOTTKY BARRIER AND CURRENTS THROUGH SURFACE STATES Abstract Only
O. S. Zinets, S. S. Kilchitskaya, and V. I. Strikha *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 32-33 Transl. into ENGLISH from Geliotekhnika (Tashkent, USSR), no. 6, Nov. - Dec. 1984 p 8-13 Original language document was announced in IAA as A85-24047 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25612# Joint Publications Research Service, Arlington, Va.
AIR-HYDROGEN ELECTROCHEMICAL GENERATOR Abstract Only
F. Danilovskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 49 Transl. into ENGLISH from Nedelya (Moscow, USSR), 25 Apr. - 5 May 1985 p 4 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25615# Joint Publications Research Service, Arlington, Va.
DESIGN OF VIBRATION MACHINES WITH INERTIAL EXCITATION Abstract Only
N. N. Bolotnik *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 56 Transl. into ENGLISH from Izvestiya Akiademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 59-66 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25616# Joint Publications Research Service, Arlington, Va.
EFFECTIVENESS OF STRUCTURAL COUNTERMEASURES FOR REDUCING BLADE VIBRATIONS EXCITED BY RANDOM FLOW FLUCTUATIONS Abstract Only
D. M. Bavelskiy, G. I. Bogoradovskiy, G. L. Guirskiy, and M. S. Pomanychev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 57 Transl. into ENGLISH from Problemy Prochnosti (Kiev, USSR), no. 1, Jan. 1985 p 51-53 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25617# Joint Publications Research Service, Arlington, Va.
EXTENDING RANGE OF STABLE OPERATION OF AXIAL COMPRESSORS BY MEANS OF SELF-ROTATING INLET GUIDE VANES Abstract Only
V. S. Knyazev and V. L. Zhokhov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 57-58 Transl. into ENGLISH from Energomashinostroyeniye (Moscow, USSR), no. 2, Feb. 1985 p 7-9 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25618# Joint Publications Research Service, Arlington, Va.
PERIODIC MOTION OF SATELLITE RELATIVE TO CENTER OF MASS WITH UNIAXIAL ORIENTATION IN GRAVITATIONAL FIELD Abstract Only
V. V. Sazonov and M. Ye. Sidoryuk *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 68 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 3-13 Original language document was announced in IAA as A85-28901 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N86-25811# Pacific Northwest Lab., Richland, Wash.
OPERATIONAL PROCEDURES FOR THE EDDY CURRENT METAL INTEGRITY/CARTRIDGE MEASUREMENT AND EJECT SYSTEM
L. J. Kirihara, G. A. Anderson, and B. J. Burghard Dec. 1985 64 p
(Contract DE-AC06-76RL-01830)
(DE86-004491; PNL-5710) Avail: NTIS HC A04/MF A01

This Cartridge Measurement and Eject System (CMES) is intended to detect internal metal defects, such as slip plane flaws and draw-forming tears, as well as major surface defects, such as splits, dents, and heavy draw scratches, on loaded 5.56 mm cartridge lots previously rejected for split failures on test firings. The Eddy Current Metal Integrity (ECMI) system used on this CMES has the capability to detect metal forming defects that can cause such failures. The system will inspect seven zones in the cartridge case body at a rate of 425 parts per minute. The basic mechanical handler was originally designed as an online surface flaw inspection system connected to a load and assembly submodule. It has been modified into a stand-alone, bulk-fed, ECMI inspection system. For cost-effectiveness, existing designs and available hardware were used in the system where applicable. An existing Moulins roll-style cartridge feeder was adapted for CMES. The spindle assemblies, ECMI electronics, and most of the system control electronics are identical to those developed for the Cartridge Case Measurement and Eject Systems (CCMES) used on the case line submodules. A reduced data set for ECMI/CMES allowed the onboard microprocessor used on the CCMES system communication card to replace the dedicat ed minicomputer. Additional software was developed for this microprocessor to provide for CMES cartridge reject control, data handling, and data formats. This document provides the user with general procedures for operating and maintaining the ECMI/CMES. DOE

N86-25812*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CONCEPTS FOR INTERRELATING ULTRASONIC ATTENUATION, MICROSTRUCTURE AND FRACTURE TOUGHNESS IN POLYCRYSTALLINE SOLIDS
Alex Vary May 1986 30 p refs Presented at the Symposium on Solid Mechanics Research of Quantitative NDE, Evanston, Ill., 18-20 Sep. 1985
(NASA-TM-87339; E-3086; NAS 1.15:87339) Avail: NTIS HC A03/MF A01 CSCL 14D

Conceptual models are advanced for explaining and predicting empirical correlations found between ultrasonic measurements and fracture toughness of polycrystalline solids. The models lead to insights concerning microstructural factors governing fracture processes and associated stress wave interactions. Analysis of the empirical correlations suggested by the models indicate that, in addition to grain size and shape, grain boundary reflections, elastic anistropy, and dislocation damping are factors that underly both fracture toughness and ultrasonic attenuation. One outcome is that ultrasonic attenuation can predict the size of crack blunting or process zones that develop in the vicinity active cracks in metals. This forms a basis for ultrasonic ranking according to variations in fracture toughness. Author

N86-25813# General Electric Co., Syracuse, N.Y.
METALLIZATION QUALIFICATION FOR VLSI (TRACE TEST) Final Technical Report, Jan. 1984 - Jun. 1985
Donald J. LaCombe and Earl L. Parks Sep. 1985 76 p
(Contract F30602-84-C-0019)
(AD-A163032; RADC-TR-85-175) Avail: NTIS HC A05/MF A01 CSCL 14/2

The objective of this work was to define a standard test procedure to qualify VLSI metallization systems for government applications. The susceptibility of the metallization to electromigration was the primary concern of this qualification. Life tests were conducted in which a large number of test lines were stressed to failure. Resistance change was monitored and the correlation between rate of change and lifetime evaluated. It was determined

that the correlation was small and therefore resistometric test methods are not suitable for predicting life. Finite element modeling of the resistance change process was used to explain some of the anomalous resistance variations which were observed. The time to failure was found to be log-normally distributed down to the 0.2% failure point. It was also found that a very long test line is statistically equivalent to many shorter lines when evaluating early failures. Therefore, a lift test in which a modest number of very long lines are tested to failure is an efficient test for evaluating early failures. GRA

N86-25814# State Univ. of New York, Stony Brook. Dept. of Mathematics and Statistics.
RELIABILITY IMPORTANCE FOR CONTINUUM STRUCTURE FUNCTIONS
Chul Kim and Laurence A. Baxter 1985 24 p refs
(Grant AF-AFOSR-0243-84)
(AD-A164006; AFOSR-86-0035TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

A continuum structure function is a nondecreasing mapping from the unit hypercube to the unit interval. A definition of the reliability importance, R (alpha) sub i say, of component i at level alpha (0 < alpha < or = 1) is proposed. Some properties of this function are deducted, in particular conditions under which the limit as alpha approaches 0 of R (alpha) sub i = the limit as alpha approaches 1 of R (alpha) sub i = 0 and conditions under which R (alpha) sub i is positive (0 < alpha < 1). GRA

N86-25815# George Washington Univ., Washington, D.C. Inst. for Reliability and Risk Analysis.
RESEARCH IN SOME METHODOLOGICAL AND MODELLING ASPECTS OF RELIABILITY THEORY Final Report, 1 May 1983 - 31 Aug. 1984
Nozer D. Singpurealla 17 Dec. 1985 9 p refs
(AD-A164007; GWU/IRRA/TR-85/18; ARO-19960.1-MA) Avail: NTIS HC A02/MF A01 CSCL 14/4

In this report a summary of the various topics of interest in reliability and life testing research are presented. References to published literature are cited. The topics covered are described by these words: Quantile estimation; Bayesian life table; Failure rate estimation; Kalman filtering; Reliability growth; Software reliability; Nonhomogeneous poisson process; Time series analysis; Random coefficient autoregressive model; Adaptive Kalman filter. GRA

N86-25816# Texas A&M Univ., College Station. Mechanics and Materials Research Center.
ULTRASONIC NONDESTRUCTIVE EVALUATION OF DAMAGE IN CONTINUOUS FIBER COMPOSITES Annual Technical Report, 1 Feb. 1984 - 31 Jan. 198
Vikram K. Kinra Apr. 1985 97 p refs
(Grant AF-AFOSR-0066-84)
(AD-A164056; MM-5024-85-7; AFOSR-85-1227TR) Avail: NTIS HC A05/MF A01 CSCL 11/4

It is well known that composite materials suffer complex damage when they are subjected to either monotonic or fatigue loading. This damge affects both the velocity and attenuation of ultrasonic waves. The primary objective of this research is to correlate the damage states with the changes in the velocity and attenuation. Once this has been accomplished the pair of ultrasonic parameters becomes a measure of the damage. A very accurate computer-controlled experimental technique to measure wave-speed in a composite material has been developed. For conventional isotropic materials accuracies of two parts per 10,000 were achieved; for highly damaged graphite/epoxy composite materials accuracies of 0.2% have been achieved. GRA

N86-25817# Ohio State Univ., Columbus. Research Foundation.
EFFECTS OF ASSUMING INDEPENDENT COMPONENT FAILURE TIMES, IF THEY ARE ACTUALLY DEPENDENT, IN A SERIES SYSTEM AFOSR-85-1215TR HC A07/MF A01 Annual Report, 1 Oct. 1984 - 31 Oct. 1985
Melvin L. Moeschberger and John P. Klein Dec. 1985 133 p refs
(Grant AF-AFOSR-0307-82)
(AD-A164417; AFOSR-85-1215TR) Avail: NTIS HC A07/MF A01 CSCL 12/1

The overall objective is to investigate the robustness to departures from independence of methods currently in use in reliability studies when competing failure modes or competing causes of failure associated with a single mode are present in a series system. The first specific aim is to examine the error one makes in modeling a series system by a model which assumes statistically independent component lifetimes when in fact the component lifetimes follow some multivariate distribution. The second specific aim is to assess the effects of the independence assumption on the error in estimating component parameters from life tests on series systems. In both cases, estimates of such errors will be determined via mathematical analysis and computer simulations for several prominent multivariate distributions. A graphical display of the errors for representative distributions will be made available to researchers who wish to assess the possible erroneous assumption of independent competing risks. A third aim is to tighten the bounds on estimates of component reliability when the risks belong to a general dependence class of distributions. GRA

N86-25818# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
FLAW DETECTION OF PRESSURE VESSELS BY LASER-HOLOGRAPHIC NON-DESTRUCTIVE DETECTION (NDT) TECHNIQUE
Zhong-Zheng Zheng 10 Jan. 1986 18 p refs
(AD-A164451; FTD-ID(RRS)T-1038-85) Avail: NTIS HC A02/MF A01 CSCL 14/2

Four simulative flawed pressure vessels are subjected to hydraulic pressure for the detection by a laser holographic method. The characteristic of the fringe patterns due to the deformation of the flaws provides some valuable information which can be applied to evaluate the behavior and size of practical flaws in pressure vessels. GRA

N86-25819# Department of the Air Force, Washington, D.C.
APPARATUS FOR CONTINUOUSLY INSPECTING THE PHYSICAL CHARACTERISTICS OF PARTICULATE MATTER Patent
Robert O. Berthel, Vernon G. Plank, and Dennis L. LaGross, inventors (to Air Force) Issued 24 Dec. 1985 9 p
(AD-D012132; US-Patent-4,561,018; US-Patent-Appl-SN-442493; US-Patent-Class-358-107) Avail: US Patent and Trademark Office CSCL 08/12

This patent discloses an apparatus for continuously inspecting the physical characteristics of particulate matter having a collection and conveying system, a sampling compartment, and a camera system. The collection and conveying system transports particulate matter, in the form of snowflakes, for example, to a viewing area in the sampling compartment. The camera system monitors the viewing areas in order to provide single or multiple images of the snowflakes on single video frames at suitable magnification in order to analyze the crystalline characteristics of the snowflakes under naturally occurring conditions. GRA

N86-25371# Royal Aircraft Establishment, Farnborough (England). Propulsion Dept.
CRACK GROWTH IN NEAR-ALPHA TITANIUM ALLOYS
C. R. Gostelow *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 5 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

N86-25380# National Aerospace Lab., Amsterdam (Netherlands).
TURBISTAN: A STANDARD LOAD SEQUENCE FOR AIRCRAFT ENGINE DISCS
A. J. A. Mom, W. J. Evans (Royal Aircraft Establishment, Farnborough, England), and A. A. tenHave *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985

12 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

N86-25381# Rolls-Royce Ltd., Derby (England).
AN ANALYSIS OF RIG TEST DISC FAILURES
G. Asquith *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 10 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

N86-25383# National Research Council of Canada, Ottawa (Ontario).
PRACTICAL EXPERIENCE WITH DAMAGE TOLERANCE BASED LIFE EXTENTION OF TURBINE ENGINE COMPONENTS
A. K. Koul, R. Thamburaj (Carleton Univ., Ottawa, Ontario), M. D. Raizenne, W. Wallace, and M. C. DeMalherbe *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 9 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N86-25820 ESDU International Ltd., London (England).
COMPUTER PROGRAM FOR THE FLEXIBILITY OF SINGLE AND DOUBLE LAP THIN PLATE JOINTS LOADED IN TENSION
Dec. 1985 21 p refs
(ESDU-85035; ISBN-0-85679-541-0; ISSN-0141-4097) Avail: ESDU

A FORTRAN program is given to compute the bolt loads, joint extension, and joint flexibility of a multibolt, single row, single lap joint under in-plane tension. The analysis may be applied to double lap joints and multiple row joints provided the rows are identical. The program uses the flexibility of the individual bolts provided by a previous report. The details of the idealization taken are given, and a worked example illustrates the input and output formats used. The joint stiffness value will be particularly useful to represent such a joint when using a finite element analysis to determine the gross load distribution through a structure. Author

N86-25821 ESDU International Ltd., London (England).
NATURAL FREQUENCIES OF SIMPLY-SUPPORTED SANDWICH PANELS WITH LAMINATED FACE PLATES
Dec. 1985 59 p refs
(ESDU-85037; ISBN-0-85679-543-7; ISSN-0141-3961) Avail: ESDU

A computer program is given for estimating the lower natural frequencies of initially unstressed rectangular sandwich panels, and is presented for convenient use when the face plates are fiber reinforced laminates. It applies to flat, or slightly curved, panels with thin orthotropic face plates having their principal axes or orthotropy aligned with the sides. The face plates may be of different materials and thicknesses and the core is assumed to have zero flexural stiffness. Simply supported edges are assumed, but guidance is provided on the use of effective panel dimensions to allow consideration of other edge conditions. Predictions of natural frequency are compared with test results from the literature for panels with fiber reinforced plates and agree to within 10 percent. Details of input and output format are provided through a practical work example and the complete listing in FORTRAN and BASIC is included. Author

N86-25822*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CYCLIC CREEP ANALYSIS FROM ELASTIC FINITE-ELEMENT SOLUTIONS
A. Kaufman and S. Y. Hwang (South Carolina State Coll., Orangeburg) 1986 21 p refs Presented at the Southeastern Conference on Theoretical and Applied Mechanics, Columbia, S.C., 17-18 Apr. 1986
(NASA-TM-87213; E-2872; NAS 1.15:87213) Avail: NTIS HC A02/MF A01 CSCL 20K

A uniaxial approach was developed for calculating cyclic creep and stress relaxation at the critical location of a structure subjected to cyclic thermomechanical loading. This approach was incorporated into a simplified analytical procedure for predicting the stress-strain history at a crack initiation site for life prediction purposes. An elastic finite-element solution for the problem was used as input for the simplified procedure. The creep analysis includes a self-adaptive time incrementing scheme. Cumulative creep is the sum of the initial creep, the recovery from the stress relaxation and the incremental creep. The simplified analysis was exercised for four cases involving a benchmark notched plate problem. Comparisons were made with elastic-plastic-creep solutions for these cases using the MARC nonlinear finite-element computer code. Author

N86-25823*# Computer Software Management and Information Center, Athens, Ga.
FOURTEENTH NASTRAN USERS' COLLOQUIUM
May 1986 337 p refs Colloquium held in San Diego, Calif. 5-9 May 1986
(Contract NASw-3247)
(NASA-CP-2419; NAS 1.55:2419) Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

The proceedings of a colloquium are presented along with technical papers contributed during the conference. Reviewed are general applications of finite element methodology and the specific application of the NASA Structural Analysis System, NASTRAN, to a variety of static and dynamic sturctural problems. For individual titles, see N86-25824 through N86-25842.

N86-25824*# Nippon Univac Kaisha Ltd. (Japan).
ENHANCEMENTS TO SPERRY/NASTRAN
Tadashi Koga *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 1-27 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

Reviewed is the enhancement to NASTRAN program performed by NUK (Nippon Univac Kaisha, Ltd.) added to Level 15.5. Features discussed include intermediate checkpoint-restart in triangular decomposition, I/O improvement, multibanked memory and new plate element. The first three improvements provide the capability to solve significantly large size problems, while the new elements release the analyst from the cumbersome work to constrain the singularities caused by the lack of stiffness of inplane rotation of old plate elements. Author

N86-25825*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
IMPROVED ISOPARAMETRIC SOLID AND MEMBRANE ELEMENTS
William R. Case and Richard E. Vandegrift *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 28-55 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

Improvements that were made to the COSMIC NASTRAN elements CIHEX1 and QDMEM1 are described. These elements are isoparametric representations of solid and membrane elastic behavior. Recent papers by the authors have shown the official COSMIC versions of these elements to be inferior to those available in the MacNeal-Schwendler Corporation (MSC) version of NASTRAN in that they are overly stiff for some loadings. Modifications were made to these elements which reduce the order of integration for shear terms and, for the eight-mode solid element, add additional strain functions. The resulting element formulations give behavior similar to that of the MSC elements. The changes made

in the element formulations are discussed and results of test problems are compared with results from the official COSMIC elements and with the MSC elements. Author

N86-25826*# Aerostructures, Inc., Arlington, Va.
DYNAMIC AND AEROELASTIC ANALYSES OF TURBOSYSTEMS IN NASTRAN
V. Elchuri and P. R. Pamidi (RPK Corp., Columbia, Md.) *In* Computer Software Management and Information Center Fourteenteh NASTRAN Users' Colloquium May 1986 p 56-60 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

Several new capabilities dealing with the dynamic and aeroelastic analyses of turbosystems have been added as standard features to the April 1986 release of NASTRAN. A brief description is given of these capabilities and their implementation in NASTRAN are outlined. Author

N86-25827*# Rockwell International Corp., Pittsburgh, Pa. Space Transportation Systems Div.
NASTRAN DATA DECK GENERATION ON THE PC
Robert J. Guyan *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 61-72 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

Using two commercial programs an application was developed to aid in generating a run-ready NASTRAN data deck on the PC. Macros are used to access relevant reference material and card files while editing the deck. The application can be easily customized to suit individual or group needs. Author

N86-25828*# Computer Software Management and Information Center, Athens, Ga.
PRE- AND POST-PROCESSING FOR COSMIC/NASTRAN ON PERSONAL COMPUTERS AND MAINFRAMES
H. A. Kamel, Anton V. Mobley, Ben Nagaraj, and K. W. Watkins *In its* Fourteenth NASTRAN Users' Colloquium May 1986 p 73-102 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

An interface between Cosmic/NASTRAN and GIFTS has recently been released, combining the powerful pre- and post-processing capabilities of GIFTS with Cosmic/NASTRAN's analysis capabilities. The interface operates on a wide range of computers, even linking Cosmic/NASTRAN and GIFTS when the two are on different computers. GIFTS offers a wide range of elements for use in model construction, each translated by the interface into the nearest Cosmic/NASTRAN equivalent; and the options of automatic or interactive modelling and loading in GIFTS make pre-processing easy and effective. The interface itself includes the programs GFTCOS, which creates the Cosmic/NASTRAN input deck (and, if desired, control deck) from the GIFTS Unified Data Base, COSGFT, which translates the displacements from the Cosmic/NASTRAN analysis back into GIFTS; and HOSTR, which handles stress computations for a few higher-order elements available in the interface, but not supported by the GIFTS processor STRESS. Finally, the versatile display options in GIFTS post-processing allow the user to examine the analysis results through an especially wide range of capabilities, including such possibilities as creating composite loading cases, plotting in color and animating the analysis. Author

N86-25829*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
NASTRAN INTERFACING MODULES WITHIN THE INTEGRATED ANALYSIS CAPABILITY (IAC) PROGRAM
Harold P. Frisch *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 103-129 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

The IAC program provides the framework required for the development of an extensive multidisciplinary analysis capability. Several NASTRAN related capabilities were developed which can all be expanded in a routine manner to meet in-house unique needs. Plans are to complete the work discussed herein and to provide it to the engineering community through COSMIC. Release is to be after the current IAC Level 2 contract work on the IAC executive system is completed and meshed with the interfacing modules and analysis capabilities under development at the GSFC. Author

N86-25830*# Intergraph Corp., Huntsville, Ala.
A SYSTEM APPROACH TO DESIGN-ANALYSIS
Gil White *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 130-144 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

Today, the increased use of Finite Element Analysis coupled with computer graphics interfaces presents the analyst with many alternatives. The drive toward automation has resulted in the creation of many modeling and post-processing systems that are in use today throughout the world. Many of these systems exist as islands of technology. The need for fully integrated systems is being met by many companies today. Author

N86-25831*# Naval Ship Research and Development Center, Bethesda, Md.
EXPERIENCES WITH NASTRAN IN A MULTIDISCIPLINARY OPTIMIZATION ENVIRONMENT
Myles M. Hurwitz *In its* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 145-153 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

NASTRAN and COPES/CONMIN were used in the early-stage design optimization of a propeller and shaft. The work was undertaken, in part, to assess the performance of these programs for such a task. While the optimization was successful, some drawbacks to the approach surfaced and are discussed. Author

N86-25832*# Naval Ocean Systems Center, San Diego, Calif.
STRESS CONCENTRATION INVESTIGATIONS USING NASTRAN
M. C. Gillcrist and L. A. Parnell *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 154-165 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

Parametic investigations are performed using several two dimensional finite element formulations to determine their suitability for use in predicting extremum stresses in marine propellers. Comparisons are made of two NASTRAN elements (CTRIM6 and CTRAIA2) wherein elasticity properties have been modified to yield plane strain results. The accuracy of the elements is investigated by comparing finite element stress predictions with experimentally determined stresses in two classical cases: (1) tension in a flat plate with a circular hole; and (2) a filleted flat bar subjected to in-plane bending. The CTRIA2 element is found to provide good results. The displacement field from a three dimensional finite element model of a representative marine propeller is used as the boundary condition for the two dimensional plane strain investigations of stresses in the propeller blade and fillet. Stress predictions from the three dimensional analysis are compared with those from the two dimensional models. The validity of the plane strain modifications to the NASTRAN element is checked by comparing the modified CTRIA2 element stress predictions with those of the ABAQUS plane strain element, CPE4. Author

N86-25833*# Rockwell International Corp., Pittsburgh, Pa. Space Transportation Systems Div.

DIFFERENTIAL STIFFNESS EFFECTS
Ben H. Ujihara and Edward T. Tong *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 166-172 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

Differential stiffness as developed in NASTRAN is a linear change in stiffness caused by applied loads. Examples of differential stiffness are the stiffening effects of gravity forces in a pendulum, centrifugal forces in rotor blades and pressure loading of shell structures. In cases wherein this stiffness caused by a load is destabilizing, the differential stiffness concept lends itself to nonlinear structural analysis. Rigid Formats 4 (static analysis with differential stiffness) and 13 (normal modes with differential stiffness) are specifically designed to account for such stiffness changes. How pressure loading may be treated in these rigid formats is clarified. This clarification results from modal correlation of Ground Vibration Test (GVT) results from the empty and pressurized Filament Wound Case (FWC) quarter-scale Space Shuttle solid rocket booster (QSSRB). A sketch of the QSSRB cantilevered to the floor by its external tank attachments is shown. Author

N86-25834*# Butler Analyses, Towson, Md.
TEST VERSUS ANALYSIS: A DISCUSSION OF METHODS
Thomas G. Butler *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 173-186 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

Some techniques for comparing structural vibration data determined from test and analysis are discussed. Orthogonality is a general category of one group, correlation is a second, synthesis is a third and matrix improvement is a fourth. Advantages and short-comings of the methods are explored with suggestions as to how they can complement one another. The purpose for comparing vibration data from test and analysis for a given structure is to find out whether each is representing the dynamic properties of the structure in the same way. Specifically, whether: mode shapes are alike; the frequencies of the modes are alike; modes appear in the same frequency sequence; and if they are not alike, how to judge which to believe. Author

N86-25835*# Martin Marietta Corp., Orlando, Fla.
A COMPARISON OF NASTRAN (COSMIC) AND EXPERIMENTAL RESULTS FOR THE VIBRATION OF THICK OPEN CYLINDRICAL CANTILEVERED SHELLS
Wayne L. Mindle and Peter J. Torvik (Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.) *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 187-204 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

The natural frequencies and associated mode shapes for three thick open cantilevered cylindrical shells were determined both numerically and experimentally. The shells ranged in size from moderately to very thick with length to thickness ratios of 16, 8 and 5.6, the independent dimension being the shell thickness. The shell geometry is characterized by a circumferential angle of the 142 degrees and a ratio of length to inner radii arc length near 1.0. The finite element analysis was performed using NASTRAN's (COSMIC) triangular plate bending element CTRIA2, which includes membrane effects. The experimental results were obtained through holographic interferometry which enables one to determine the resonant frequencies as well as mode shapes from photographs of time-averaged holograms. Author

N86-25836*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NASTRAN STRUCTURAL MODEL FOR THE LARGE GROUND ANTENNA PEDESTAL WITH APPLICATIONS TO HYDROSTATIC BEARING OF FILM
Chian T. Chian *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 205-235 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

Investigations were conducted on the 64-meter antenna hydrostatic bearing oil film thickness under a variety of loads and elastic moduli. These parametric studies used a NASTRAN pedestal structural model to determine the deflections under the hydrostatic bearing pad. The deflections formed the input for a computer program to determine the hydrostratic bearing oil film thickness. For the future 64-meter to 70-meter antenna extension and for the 2.2-meter (86-in.) haunch concrete replacement cases, the program predicted safe oil film thickness (greater than 0.13 mm (0.005 in.) at the corners of the pad). The effects of varying moduli of elasticity for different sections of the pedestal and the film height under stressed runner conditions were also studied. Author

N86-25837*# Rockwell International Corp., Los Angeles, Calif.
SOLVING LARGE-SCALE DYNAMIC SYSTEMS USING BAND LANCZOS METHOD IN ROCKWELL NASTRAN ON CRAY X-MP
Viney K. Gupta, Scott D. Zillmer, and Robert E. Allison *In* Computer Software Management and Information Cener Fourteenth NASTRAN Users' Colloquium May 1986 p 236-246 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

The improved cost effectiveness using better models, more accurate and faster algorithms and large scale computing offers more representative dynamic analyses. The band Lanczos eigensolution method was implemented in Rockwell's version of 1984 COSMIC-released NASTRAN finite element structural analysis computer program to effectively solve for structural vibration modes including those of large complex systems exceeding 10,000 degrees of freedom. The Lanczos vectors were re-orthogonalized locally using the Lanczos Method and globally using the modified Gram-Schmidt method for sweeping rigid-body modes and previously generated modes and Lanczos vectors. The truncated band matrix was solved for vibration frequencies and mode shapes using Givens rotations. Numerical examples are included to demonstrate the cost effectiveness and accuracy of the method as implemented in ROCKWELL NASTRAN. The CRAY version is based on RPK's COSMIC/NASTRAN. The band Lanczos method was more reliable and accurate and converged faster than the single vector Lanczos Method. The band Lanczos method was comparable to the subspace iteration method which was a block version of the inverse power method. However, the subspace matrix tended to be fully populated in the case of subspace iteration and not as sparse as a band matrix. Author

N86-25838*# Naval Ocean Systems Center, San Diego, Calif.
FLUTTER ANALYSIS OF LOW ASPECT RATIO WINGS
L. A. Parnell *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 247-263 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

Several very low aspect ratio flat plate wing configurations are analyzed for their aerodynamic instability (flutter) characteristics. All of the wings investigated are delta planforms with clipped tips, made of aluminum alloy plate and cantilevered from the supporting vehicle body. Results of both subsonic and supersonic NASTRAN aeroelastic analyses as well as those from another version of the program implementing the supersonic linearized aerodynamic theory are presented. Results are selectively compared with the experimental data; however, supersonic predictions of the Mach Box method in NASTRAN are found to be erratic and erroneous, requiring the use of a separate program. Author

N86-25839*# Texas Instruments, Inc., Dallas.
FINITE ELEMENT MODELLING OF NON-LINEAR MAGNETIC CIRCUITS USING COSMIC NASTRAN
T. J. Sheerer *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 265-281 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

The general purpose Finite Element Program COSMIC NASTRAN currently has the ability to model magnetic circuits with constant permeablilities. An approach was developed which, through small modifications to the program, allows modelling of non-linear magnetic devices including soft magnetic materials, permanent magnets and coils. Use of the NASTRAN code resulted in output which can be used for subsequent mechanical analysis using a variation of the same computer model. Test problems were found to produce theoretically verifiable results. Author

N86-25840*# Naval Ship Research and Development Center, Bethesda, Md. Numerical Structural Mechanics Branch.
CALCULATING FAR-FIELD RADIATED SOUND PRESSURE LEVELS FROM NASTRAN OUTPUT
Robert R. Lipman *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 282-292 refs Original contains color illustrations (For primary document see N86-25823 16-71)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

FAFRAP is a computer program which calculates far field radiated sound pressure levels from quantities computed by a NASTRAN direct frequency response analysis of an arbitrarily shaped structure. Fluid loading on the structure can be computed directly by NASTRAN or an added-mass approximation to fluid loading on the structure can be used. Output from FAFRAP includes tables of radiated sound pressure levels and several types of graphic output. FAFRAP results for monopole and dipole sources compare closely with an explicit calculation of the radiated sound pressure level for those sources. Author

N86-25841*# Naval Ship Research and Development Center, Bethesda, Md. Numerical Mechanics Div.
A GENERAL LOW FREQUENCY ACOUSTIC RADIATION CAPABILITY FOR NASTRAN **c71**
G. C. Everstine, F. M. Henderson, E. A. Schroeder, and R. R. Lipman *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium 1986 p 293-310 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

A new capability called NASHUA is described for calculating the radiated acoustic sound pressure field exterior to a harmonically-excited arbitrary submerged 3-D elastic structure. The surface fluid pressures and velocities are first calculated by coupling a NASTRAN finite element model of the structure with a discretized form of the Helmholtz surface integral equation for the exterior fluid. After the fluid impedance is calculated, most of the required matrix operations are performed using the general matrix manipulation package (DMAP) available in NASTRAN. Far field radiated pressures are then calculated from the surface solution using the Helmholtz exterior integral equation. Other output quantities include the maximum sound pressure levels in each of the three coordinate planes, the rms and average surface pressures and normal velocities, the total radiated power and the radiation efficiency. The overall approach is illustrated and validated using known analytic solutions for submerged spherical shells subjected to both uniform and nonuniform applied loads. Author

N86-25842*# Naval Underwater Systems Center, New London, Conn.
A FINITE ELEMENT SURFACE IMPEDANCE REPRESENTATION FOR STEADY-STATE PROBLEMS
A. J. Kalinowski *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 311-330 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

A procedure for determining the scattered pressure field resulting from a monochromatic harmonic wave that is incident upon a layer energy absorbing structure is treated. The situation where the structure is modeled with finite elements and the surrounding acoustic medium (water or air) is represented with either acoustic finite elements, or some type of boundary integral formulation, is considered. Finite element modeling problems arise when the construction of the structure, at the fluid structure interface, are nonhomogeneous and in particular, when the inhomogeneities are small relative to the acoustic wave length. An approximate procedure is presented for replacing the detailed microscopic representation of the layered surface configuration with an equivalent simple surface impedance finite element, which is especially designed to work only at limited frequencies. An example problem is presented using NASTRAN. However, the procedure is general enough to adapt to practically any finite element code having a steady state option. Author

N86-25843 Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 17, NO. 11 Monthly Report
Judith Nagle-Eshleman, ed. Nov. 1985 91 p refs Sponsored by NRL
(AD-A163153) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

Topics relative to shock and vibration are discussed. The dynamic behavior of composite and sandwich plates and damping in structural joints are discussed. For individual titles, see N86-25844 through N86-25845.

N86-25844 Oklahoma Univ., Norman. School of Aerospace, Mechanical and Nuclear Engineering.
RESEARCH ON DYNAMIC BEHAVIOR OF COMPOSITE AND SANDWICH PLATES, 4
C. W. Bert *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 17, No. 11 Nov. 1985 p 3-15 refs (For primary document see N86-25843 16-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

A survey of the literature concerning the dynamic behavior of plate-type structural elements of either composite material or sandwich construction is given. Papers from mid-1982 through early 1985 and several references published late in 1981 are reviewed. Enphasis is given to transverse impact and subsequent damage, environmental aspects, linear and nonlinear analysis and design (including aeroelastic tailoring). Configurations include rectangularly and cylindrically orthotropic and laminated thin plates; thick plates and sandwich plates. Author

N86-25845 Imperial Coll. of Science and Technology, London (England). Dept. of Mechanical Engineering.
DAMPING IN STRUCTURAL JOINTS
C. F. Beards *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 17, No. 11 Nov. 1985 p 17-20 refs (For primary document see N86-25843 16-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

Joint damping is the major source of inherent structural damping. Because of increasing demands for higher damping, joints must be carefully controlled to yield the maximum damping compatible with the duty of the structure. To this end, refined analyses of damping and force transfer mechanisms in joints are being developed and the range of application of joint damping is being increased. Author

N86-25846# Sandia National Labs., Albuquerque, N. Mex.
NATURAL FREQUENCIES AND MODE SHAPES OF A FREE RECTANGULAR PLATE AS A FUNCTION OF THE ASPECT RATIO

D. L. Gregory and D. O. Smallwood 1986 7 p Presented at the 4th International Modal Analysis Conference, Los Angeles, Calif., Feb. 1986
(Contract DE-AC04-76DP-00789)
(DE85-018544; SAND-85-2095C; CONF-860224-3) Avail: NTIS HC A02/MF A01

Numerous modal systems are now available, and new users are continually being introduced to these systems. A simple test structure would be useful to compare these systems on a common basis. The structure would also provide a means to help train new users. Efforts to develop such a structure led to the analysis of free rectangular plates. The natural frequencies as a function of the aspect ratio (ratio of width to length) were analyzed to find an aspect ratio which would yield a desirable distribution of modal frequencies. A desirable distribution includes both widely separated and closely coupled modes. Results for sensitivity studies of mode shapes and frequencies to plate parameters are also given. DOE

N86-25847# Rochester Univ., N. Y. Dept. of Mechanical Engineering.
FRACTURE TOUGHNESS OF MATERIALS Progress Report, Oct. 1984 - Oct. 1985
S. J. Burns 1985 18 p
(Contract DE-FG02-84ER-45051)
(DE86-004545; DOE/ER-45051/T2) Avail: NTIS HC A02/MF A01

The fracture toughness of partially stabilized zirconia has been measured, for specimens that are extremely metastable, to be approx. 30MPa (RADICAL)(PI). This is the largest fracture toughness of any known ceramic. The toughness is measured using a non-linear deformation analysis. Crack tip shielding in steels has been applied to warm pre-stressed specimens. The liquid N2 toughness is elevated by about a factor of two. Thermodynamic cycles applied to partially stabilized zirconia have measured linear expansion coefficients at selected unaxial stress states. The hysteretic volume-temperature-stress surface has been determined, including two phase transformations. DOE

N86-25848# Sandia National Labs., Albuquerque, N. Mex.
COMBINED EXPERIMENTAL/ANALYTICAL MODELING OF SHELL/PAYLOAD STRUCTURES
D. R. Martinez, A. K. Miller, and T. G. Carne Dec. 1985 47 p
(Contract DE-AC04-76DP-00789)
(DE86-004968; SAND-84-2598) Avail: NTIS HC A03/MF A01

The accuracy of computed modal frequencies obtained from a combined experimental/analytical model of a shell/payload structure is discussed. A component mode synthesis technique was used which incorporated free modes and residual effects. The total structure is physically divided into the two subsystems which are connected through stiff joints. The payload was tested to obtain its free-free modes, while a finite element model of the shell was analyzed to obtain its modal description. Both the translational and rotational components of the experimental mode shapes at the payload interface were used in the coupling. Sensitivity studies were also performed to determine the effect of neglecting the residual terms of the payload. Results from a previous study of a combined experimental/analytical model for a beam structure are also given. The beam structure was used to examine the basic procedures and difficulties in experimentally measuring, and analytically accounting for the rotational and residual quantities. DOE

N86-25849# Stanford Univ., Calif. Dept. of Mechanical Engineering.
MULTIAXIAL FATIGUE DAMAGE IN METALS Final Report
A. Rostami and D. Nelson Dec. 1985 217 p
(Contract DE-AS03-81ER-10999)
(DE86-004887; DOE/ER-10999/T1) Avail: NTIS HC A10/MF A01

This review summarizes empirical trends and discusses available life prediction approaches. An evaluation of three of the more promising approaches for predicting multiaxial fatigue life is then presented. Evaluation of the approaches is based on the literature as well as tests of A533B pressure vessel steel. In these deflection-controlled tests, specimens were subjected to combined bending and torsion, applied both in-phase and 90(0) out-of-phase, at two different fixed ratios of applied torsional shear strain range to bending strain range, and at several strain ranges to produce lives between 10(3) and 10(6) cycles. The plastic work approach was superior to the others. Differences in crack formation and growth behavior with differences in the above test parameters are presented, and their significance discussed in terms of development of improved methods for predicting multiaxial fatigue life. A new theory for predicting crack propagation rates for complex multiaxial loading is subsequently developed. A procedure for estimating the J-integral for mixed mode cracking is developed. DOE

N86-25850*# Michigan State Univ., East Lansing. Dept. of Metallurgy, Mechanics and Materials Science.
EXPERIMENTAL EVALUATION CRITERIA FOR CONSTITUTIVE MODELS OF TIME DEPENDENT CYCLIC PLASTICITY Final Report, 1 Jun. 1980 - 30 Sep. 1983
John F. Martin 1986 13 p
(Grant NAG3-51)
(NASA-CR-176821; NAS 1.26:176821) Avail: NTIS HC A02/MF A01 CSCL 20K

Notched members were tested at temperatures far above those recorded till now. Simulation of the notch root stress response was accomplished to establish notch stress-strain behavior. Cyclic stress-strain profiles across the net-section were recorded and on-line direct notch strain control was accomplished. Data are compared to three analysis techniques with good results. The objective of the study is to generate experimental data that can be used to evaluate the accuracy of constitutive models of time dependent cyclic plasticity. Author

N86-25851*# Case Western Reserve Univ., Cleveland, Ohio.
FATIGUE CRACK LAYER PROPAGATION IN SILICON-IRON Final Report
Y. Birol, G. Welsch, and A. Chudnovsky May 1986 47 p refs
(Grant NAG3-223)
(NASA-CR-175115; NAS 1.26:175115) Avail: NTIS HC A03/MF A01 CSCL 20K

Fatigue crack propagation in metal is almost always accompanied by plastic deformation unless conditions strongly favor brittle fracture. The analysis of the plastic zone is crucial to the understanding of crack propagation behavior as it governs the crack growth kinetics. This research was undertaken to study the fatigue crack propagation in a silicon iron alloy. Kinetic and plasticity aspects of fatigue crack propagation in the alloy were obtained, including the characterization of damage evolution. Author

N86-25852# Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
VOID/PORE DISTRIBUTIONS AND DUCTILE FRACTURE
E. M. Dubensky and D. A. Koss Nov. 1985 31 p refs
(Contract N00014-85-K-0427)
(AD-A163508; TR-2) Avail: NTIS HC A03/MF A01 CSCL 20/11

The effects of void or pore distributions on ductile fracture has been modeled experimentally. Pores or voids are physically modeled in two dimensions by both random and regular arrays of equi-sized holes drilled through the thickness of tensile specimens of 1100-0 Al sheet and 7075-T6 Al plate and sheet. Fracture strains as well as failure paths have been determined for different hole sizes, spacings, and area fractions. A statistical analysis of the data indicates that increasing the minimum hole spacing, which decreases the degree of hole clustering, increases both strength and ductility. Conversely, decreasing the hole size causes a minor increase in both strength and ductility. Increasing the rate of work hardening is beneficial to ductility in that a high strain hardening rate appears to increase the resistance to flow localization between holes. The results are discussed in terms of a fracture process which depends on shear localization between holes/voids and which is very sensitive to void/pore distributions. GRA

N86-25853# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

THE EFFECTS OF THROUGH THE THICKNESS DELAMINATIONS ON CURVED COMPOSITE PANELS M.S. Thesis

Blaise A. Horban Dec. 1985 105 p refs

(AD-A164110; AFIT/GAE/AA/85D-8) Avail: NTIS HC A06/MF A01 CSCL 13/13

The buckling loads of 8-ply A54/3501-6 graphite/epoxy delaminated cylindrical panels were determined experimentally. The delaminations fabricated into the laminate, with mylar and teflon inserts, were indicative of low velocity projectile impact damage. The mylar and teflon inserts caused partial and total delaminations, respectively. Two types of delaminations were used; namely, eccentric, off mid-surface, and mid-surface. The eccentric delaminations were placed progressively through the thickness of the laminate. STAGSC-1 finite element computer code results for undelaminated composite panels were compared to the experimental results to obtain a percent strength degradation. The experimental testing was accomplished by the Air Force Flight Dynamics Laboratory. The test device provided boundary conditions of clamped top and bottom edges and simply supported vertical sides. Two destructive techniques, stereo X-ray and deply, were used to determine the total delaminated areas and locations. Based in part on these results, one equivalent delamination was obtained corresponding to the total area of the multiple partial delaminations. The panels with multiple delaminations were found to be approximately 5% weaker than a single delaminated area of the same total size. GRA

N86-25854# SRI International Corp., Menlo Park, Calif.

DEVELOPMENT OF AN EXPERIMENTAL TECHNIQUE AND RELATED ANALYSES TO STUDY THE DYNAMIC TENSILE FAILURE OF CONCRETE Annual Report, 1 May 1982 - 30 Apr. 1985

James K. Gran 31 Jul. 1985 225 p refs

(Contract F49620-82-K-0021)

(AD-A164261; AFOSR-85-1240TR) Avail: NTIS HC A10/MF A01 CSCL 13/3

The objective of this research was to develop and demonstrate experimental and analytical techniques to study the tensile failure of concrete and geologic materials at strain rates of about 10 per second. A new experimental method was developed, a set of experiments was conducted, and the experiments were interpreted with numerical calculations. In the new experiments, a 5-cm-diameter rod is first loaded in static triaxial compression, then the axial pressure is released from each end simultaneously and very rapidly. The resulting relief waves interact in the center of the rod to produce a dynamic tensile stress equal in magnitude to the original static compression. Tensile failure occurs if the tensile stress exceeds the tensile strength for these conditions. The radial pressure is held approximately constant during the experiment. Several experiments of this type were performed on concrete. In every case the rod fractured near the midpoint; in some cases a second fracture also occurred several centimeters from the midpoint. Transient measurements were made of the axial load at each end, the confining pressure, and axial and circumferential surface strains at several locations along the length of the rod. Each experiment was interpreted with a set of one-dimensional finite differ ence calculations, using an elastic-fracturing (strain-softening) representation for the material. By trial and error, material parameters were chosen for each experiment so that satisfactory agreement could be achieved. GRA

N86-25855# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

IMPROVEMENT OF END BOUNDARY CONDITIONS FOR OFF-AXIS TENSION SPECIMEN USE M.S. Thesis

Steven M. Cron Dec. 1985 136 p refs

(AD-A164321; AFIT/GAE/AA/85D-3) Avail: NTIS HC A07/MF A01 CSCL 20/11

Inaccuracies in using the off axis tension test are caused by the nonuniform stresses produced by the end constraints. The purpose of this thesis is to show that these nonuniformities can be virtually eliminated by adjusting the amount of tab clamping and selectively locating the point about which the clamp may rotate. A second phase of the study is to conduct a limited verification of a strain energy failure criteria that can account for the material nonlinearity found in composite materials. Determination of the ideal amount of clamping and point of rotation was carried out using a linear finite element method. The nonlinear behavior of the specimen was simulated using a nonlinear finite element method. The failure criteria was used in conjunction with the nonlinear finite element algorithm in determining failure. Experimentation was also carried out to verify the finite element solutions. The results indicate that a nearly uniform state of stress can be produced with ideal tab clamping and rotation. The results indicate that the nonlinear behavior of the specimen was accurately predicted by the nonlinear finite element method but that the failure state predicted by the failure criteria was in error. Suggestions are made for improving the accuracy of the failure criteria.

Author (GRA)

N86-25856# Lawrence Livermore National Lab., Calif.

MOTION OF THIN METAL WALLS AND THE EQUATION OF STATE OF DETONATION PRODUCTS. REVISION 1

E. Lee, D. Breithaupt, C. McMillan, N. Parker, J. Kury, C. Tarver, W. Quirk, and J. Walton 21 Nov. 1985 13 p Presented at the 8th International Symposium on Detonation, Albuquerque, N. Mex., 15 Jul. 1985

(Contract W-7405-eng-48)

(DE86-004237; UCRL-91490-Rev-1; CONF-850706-24-Rev-1) Avail: NTIS HC A02/MF A01

Dynamic high resolution measurements made using metal cylinders and flat plates accelerated by explosives to determine detonation product behavior are reported. By using both thin walled cylinders and plates and by utilizing both streak camera and Fabry-Perot velocimeter techniques, resolution and accuracy greater than previously attained was achieved. As an example, results for LX-14, an explosive containing 95% HMX and 5% polyurethane, are presented and compared to results of hydrodynamic calculations carried out with an accuracy equivalent to the experimental resolution. Calculations show that cylinder test measurements sample the detonation product equation of state (EOS) at expansion ratios V/VO $>$ 1. Thin flat plates aligned in the plane of the detonation front provide detailed information on the higher compression states (V (sub CJ) $<$ V/VO $<$ 1.3). The results of the study confirm earlier work with respect to the pressure derivatives. The results require that (partial derivative ln P/partial derivative ln V) (sub S) first increase as the products expand from the C-J state. DOE

N86-25857# Sandia National Labs., Albuquerque, N. Mex.

MODAL ANALYSIS OF A SHELL-PAYLOAD STRUCTURE USING TEST DATA

T. G. Carne, D. R. Martinez, M. D. Tucker, and J. P. Lauffer 1985 11 p Presented at the 4th International Modal Analysis Conference, Los Angeles, Calif., 3 Feb. 1986

(Contract DE-AC04-76DP-00789)

(DE86-002588; SAND-85-1301C; CONF-860224-4) Avail: NTIS HC A02/MF A01

The accuracy of computed modal frequencies obtained from a combined experimental/analytical model for a shell-payload structure is evaluated. The total structure is physically divided into two subsystems, the shell and the internal payload, which are connected through a stiff joint. The payload was tested to obtain its free modes, while a finite element model of the shell was analyzed to obtain its modal description. A component mode synthesis technique was investigated which incorporates free modes and residual flexibility. The experimental modal data base for the payload was directly coupled with the finite element modal model of the shell to create an experimental/analytical model of the total structure. Both the translational and rotational elements of the payload mode shapes at the interface were measured and used in the coupling. The modal frequencies, computed using the combined experimental/analytical model, were then compared to those from a modal test of the entire structure. The sensitivity of

the combined model to the residual flexibilities was also determined. Finally, recommended procedures for developing combined experimental/analytical models of shell-payload structures are given. DOE

N86-25858# Oak Ridge National Lab., Tenn.
UNLUBRICATED SLIDING WEAR OF PARTIALLY STABILIZED ZIRCONIA, TOUGHENED ALUMINA AND SILICON NITRIDE
C. S. Yust and F. J. Carignan Sep. 1985 24 p Presented at the Annual Meeting of the American Society of Lubrication Engineers, Toronto, Ontario, 12 May 1986 Prepared in cooperation with Advanced Mechanical Technology, Inc., Newton, Mass.
(Contract DE-AC05-84OR-21400)
(DE86-003016; CONF-860516-1) Avail: NTIS HC A02/MF A01

Conditions were established for a pin-on-disc sliding configuration under which unlubricated partially stabilized zirconia and toughened alumina will slide on themselves for limited periods of time without incurring extensive macroscopic surface damage. Microscopic examination, however, reveals that unlubricated sliding at the conditions resulting in minimal macroscopic surface damage is accompanied by the formation of a fine particle debris which is agglomerated and adhered to the wear path. The majority (approx.80%) of the partially stabilized zirconia specimens tested to date have experienced severe wear during unlubricated sliding under the conditions of this test program. One half of the toughened alumina specimens experienced mild wear, the remaining half severe wear. All of the silicon nitride specimens exhibited severe wear. The silicon nitride surfaces show evidence of surface chemical reaction at longer test durations, demonstrating that the chemical influence of the environment, especially on a surface under dynamic stress conditions, must be considered. The transition between mild and severe wear can take place very rapidly. These results imply transition to unacceptable wear regimes in unlubricated sliding in relatively short time periods. DOE

N86-25859# Argonne National Lab., Ill.
ELASTIC PROPERTIES OF METALLIC SUPERLATTICES
I. K. Schuller Oct. 1985 6 p Presented at the IEEE Ultrasonics Symposium, San Francisco, 16 Oct. 1985
(Contract W-31-109-eng-38)
(DE86-003071; CONF-8510219-1) Avail: NTIS HC A02/MF A01

An overview of the elastic properties and acoustic properties of metallic superlattices is presented. In general, superlattices whose constituents form solid solutions in their binary phase diagram exhibit an enhancement of the elastic constants (supermodulus effect), whereas combinations that do not form solid solutions exhibit a softening. Very little work has been performed using ultrasonic techniques, although these types of measurements could add considerable information and clarify a variety of critical issues. DOE

N86-25860# Idaho National Engineering Lab., Idaho Falls.
RECONSTRUCTION OF THE GEOMETRY OF A SURFACE-BREAKING CRACK
D. M. Tow 1985 7 p
(Contract DE-AC07-76ID-01570)
(DE86-003229; EGG-M-09485; CONF-8506110-5) Avail: NTIS HC A02/MF A01

The crack reconstruction method presented here employs a ray tracing field code described in another session of this conference. This field code calculates the transducer response to a crack of known geometry by modeling it as a collection of point scattering elements. The model is linear in that the transducer response to a collection of point scattering elements is equal to the sum of the transducer response of the individual elements. The field code is currently only capable of modeling two-dimensional geometries. In two dimensions a crack is modeled as a linear array of scattering elements. A transducer is similarly modeled as a linear array of point sources. All results discussed in this paper are two dimensional simulated results. DOE

N86-25861# New York State Dept. of Transportation, Albany. Engineering Research and Development Bureau.
LATERAL RESTRAINT OF NON-COMPOSITE BEAMS Final Research Report
R. J. Kissane Aug. 1985 27 p refs Sponsored in part by the Federal Highway Administration, Albany, N.Y.
(PB86-143781; RR-123; FHWA/NY/RR-85/123) Avail: NTIS HC A03/MF A01 CSCL 13M

Full-scale laboratory and field testing was performed to determine the restraint to elastic buckling of a steel beam supporting a non-composite concrete deck. In the laboratory testing, a 21 ft S 12x31.8 beam was loaded to flange yield without indication of lateral instability. Loads were applied through a 6 in. thick reinforced concrete slab having neither mechanical nor chemical bond to the beam. GRA

N86-25862 Colorado Univ., Boulder.
THE DYNAMICAL EQUILIBRIUM: A MATHEMATICAL MODEL FOR THE DYNAMICAL DESCRIPTION OF THE PERMANENT DEFORMATION OF AN ELASTIC MATERIAL CAUSED BY MICROFRACTURE OR PLASTIC FLOW Ph.D. Thesis
Gary Allen Dilts 1985 238 p
Avail: Univ. Microfilms Order No. DA8528480

A material which, upon the application and subsequent removal of external stress, returns to its original configuration is said to be elastic. A material which does not return to its original configuration is said to have undergone permanent or plastic deformation. Most materials are elastic for small deformation and plastic for large ones. Such elasto-plastic deformation is herein interpreted as a change in the equilibrium configuration of an elastic material. The dynamics of such a material are specified by coupling the Newtonian equations of motion with a prescription for the rate of change of the equilibrium in terms of the displacement from, and rate of displacement from, equilibrium. Thus the equilibrium itself becomes a dynamical quantity. This basic concept is developed within the context of a single mass-spring system, a lattice of harmonically interacting masses and the continuum limit of such a lattice in one and three dimensions. Dissert. Abstr.

N86-25373# Fiat Research Center, Orbassano, Turin (Italy).
SMALL DEFECT CHARACTERIZATION IN POWDER METALLURGY MATERIALS
S. Re Fiorentin and H. Walther (Fiat Aviazione S.p.A., Turin, Italy) *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 12 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

N86-25375# TRW, Inc., Cleveland, Ohio.
MULTIAXIAL AND THERMOMECHANICAL FATIGUE CONSIDERATIONS IN DAMAGE TOLERANT DESIGN
Gail E. Leese and Robert C. Bill (Army Research and Technology Labs., Cleveland, Ohio) *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 17 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

N86-25377# Naval Air Development Center, Warminster, Pa.
STATISTICAL ANALYSIS OF SPIN PIT FAILURE DATA TO PREDICT INSERVICE B.1 LIVES OF GAS TURBINE DISKS
R. Mahorter, S. Fowler, and J. Salvino (Naval Air Propulsion Test Center, Trenton, N.J.) *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 15 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

N86-25382# National Aerospace Lab., Amsterdam (Netherlands).
CONTRIBUTION OF TURBINE BLADE SERVICE FAILURES TO A DAMAGE TOLERANCE APPROACH
R. J. H. Wanhill and A. J. A. Mom *In* AGARD Damage Tolerance Concepts for Critical Engine Components Oct. 1985 13 p refs (For primary document see N86-25360 16-07)
Avail: NTIS HC A13/MF A01

N86-25549# Joint Publications Research Service, Arlington, Va.
VISIBILITY OF TRANSVERSE CRACKS FOR RADIOGRAPHIC

INSPECTION OF WELDS IN SPHERICAL VESSELS
Jicheng Xue and Yadeng Xu *In its* China Report: Science and Technology (JPRS-CST-86-011) 31 Mar. 1986 p 66-72 Transl. into ENGLISH from Wusunjiance (Shanghai, China), v. 6, no. 5, Dec. 1984 p 39-41 (For primary document see N86-25547 16-31)
Avail: NTIS HC A07/MF A01

N86-25578# Joint Publications Research Service, Arlington, Va.
INDUCED VIBRATIONS AND RESONANCE OF SHAFT UNDER NONSTEADY LOAD Abstract Only
A. I. Vesnitskiy, I. V. Miloserdova, and A. I. Potapov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 53-54 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 103-110 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25590# Joint Publications Research Service, Arlington, Va.
ACTION OF NONAXISYMMETRIC NORMAL LOAD ALONG SURFACE OF ELASTIC SHELL INTERACTING WITH FLUID Abstract Only
V. I. Pozhuyev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 82 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 58-64 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25591# Joint Publications Research Service, Arlington, Va.
GENERAL SOLUTION OF SPATIAL PROBLEM OF ELASTICITY THEORY FOR MULTILAYER ORTHOTROPIC CYLINDRICAL SHELL Abstract Only
A. S. Kosmodamianskiy and V. A. Galich *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 85 Transl. into ENGLISH from Doklady Akademii Nauk Ukrainskoy SSR, Seriya A: Fiziko-Matematicheskiye i Tekhnicheskiye Nauki (Kiev, USSR), no. 8, Aug. 1984 p 46-48 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25592# Joint Publications Research Service, Arlington, Va.
NONLINEAR VIBRATIONS OF FLEXIBLE CIRCULAR PLATES UNDER BENDING AND TENSION OR COMPRESSION LOADS Abstract Only
A. S. Kosmodamianskiy and O. P. Tatarinova *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 85 Transl. into ENGLISH from Doklady Akademii Nauk Ukrainskoy SSR, Seriya A: Fiziko-Matematicheskiye i Tekhnicheskiye Nauki (Kiev, USSR), no. 8, Aug. 1984 p 46-48 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25593# Joint Publications Research Service, Arlington, Va.
DYNAMIC EDGE EFFECT IN RIGID HOMOGENEOUS VIBRATION-ABSORBER COATING Abstract Only
V. B. Stephanov and B. D. Tartakovskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 87 Transl. into ENGLISH from Akusticheskiy Zhurnal (Moscow, USSR), v. 30, no. 3, May - Jun. 1984 p 368-372 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25594# Joint Publications Research Service, Arlington, Va.
STABILITY OF NONCIRCULAR CYLINDRICAL SHELLS UNDER AXIAL COMPRESSION Abstract Only
N. P. Semenyuk *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 88 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 43-49 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25595# Joint Publications Research Service, Arlington, Va.
OPTIMIZATION OF CYLINDRICAL SHELLS WITH VARIABLE THICKNESS FOR AXISYMMETRIC LOAD Abstract Only
N. G. Medvedev and N. P. Totskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 89 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 53-57 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25596# Joint Publications Research Service, Arlington, Va.
SPECTRUM OF NORMAL WAVES IN HOLLOW TRANSVERSELY ISOTROPIC CYLINDER Abstract Only
V. A. Moiseyenko, V. I. Storozhev, and N. A. Shulga *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 89 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 117-118 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25597# Joint Publications Research Service, Arlington, Va.
NATURAL VIBRATIONS OF SPHERICAL SHELLS REINFORCED WITH MERIDIONAL HOOPS Abstract Only
V. N. Revutskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 90 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 119-121 Original language document was announced in IAA as A85-11595 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25598# Joint Publications Research Service, Arlington, Va.
THEORY OF NONLINEARLY ELASTIC MULTILAYER SHELLS WITH TRANSVERSE SHEAR STRAIN Abstract Only
V. Ye. Verizhenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 90 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 124-127 Original language document was announced in IAA as A85-11596 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25623# Joint Publications Research Service, Arlington, Va.
APPROACH TO TACKLING PROBLEMS OF WRINKLED STATE OF SOFT SHELLS Abstract Only
V. S. Kalinin and A. S. Melamud *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 71-72 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 21, no. 2, Feb. 1985 p 67-73 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25624# Joint Publications Research Service, Arlington, Va.
EXPERIMENTAL STUDY OF TRIPLE-LAYER SPHERICAL SHELLS UNDER NONUNIFORM PRESSURE Abstract Only
V. U. Kotelnikov and V. G. Tarasenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 72 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 21, no. 2, Feb. 1985 p 117-119 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25625# Joint Publications Research Service, Arlington, Va.
INDUCED VIBRATIONS OF SPHERICAL SHELL IN ACOUSTIC WEDGE Abstract Only
M. A. Potapov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 73 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 21, no. 2, Feb. 1985 p 53-60 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25626# Joint Publications Research Service, Arlington, Va.
CERTAIN RELATIONS FOR SYSTEMS WITH DRY FRICTION Abstract Only
V. I. Levitas *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 73-74 Transl. into ENGLISH from Doklady Akademii Nauk SSSR (Moscow, USSR), v. 280, no. 1, Jan. 1985 p 52-56 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25627# Joint Publications Research Service, Arlington, Va.
ENERGY CRITERION OF DYNAMIC SNAP-OVER FOR ELASTIC SPHERICAL SHELLS Abstract Only
L. S. Srubshchik *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 74 Transl. into ENGLISH from Doklady Akademii Nauk SSSR (Moscow, USSR), v. 280, no. 1, Jan. 1985 p 60-63 Original language document was announced in IAA as A85-24178 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25628# Joint Publications Research Service, Arlington, Va.
WIDE-ANGLE INSTRUMENT FOR MEASURING DIVERGENCE OF LASER BEAM Abstract Only
Yu. A. Pokrovskiy, Ye. A. Makaretskiy, and Yu. S. Khurkhulu *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 75 Transl. into ENGLISH from Pribory i Tekhnika Eksperimenta (Moscow, USSR), no. 5, Sep. - Oct. 1984 p 240 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25638# Joint Publications Research Service, Arlington, Va.
REPRESENTATION OF MEDIAN SHELL SURFACES BY MONGE SURFACES Abstract Only
Ya. G. Savula *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 87-88 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1984 p 70-75 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25639# Joint Publications Research Service, Arlington, Va.
SPECIAL REVERSE PROBLEM FOR CYLINDRICAL SHELL OF VARIABLE THICKNESS Abstract Only
N. P. Totskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 88 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1984 p 75-80 Original language document was announced in IAA A85-24022 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25640# Joint Publications Research Service, Arlington, Va.
WAVE PROCESSES DURING FLEXURAL VIBRATIONS OF BEAMS UNDER DEFORMATION Abstract Only
K. P. Dynnik *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 88-89 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1984 p 95-100 Original language document announced in IAA as A85-24023 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25641# Joint Publications Research Service, Arlington, Va.
STABILITY OF SHELLS OF REVOLUTION WITH SMALL DEVIATIONS FROM CYLINDRICAL SHAPE Abstract Only
D. V. Babich and L. A. Deriglazova *In its* USSR Report: Engineering and Equipments (JPRS-UEQ-86-002) 7 Feb. 1986 p 90 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1984 p 106-108 Original language document was announced in IAA as A85-24024 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25642# Joint Publications Research Service, Arlington, Va.
NATURAL VIBRATION MODES OF IMPERFECT CONICAL SHELLS Abstract Only
S. Yu. Fialko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 90-91 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1984 p 109-112 Original language document was announced in IAA as A85-24025 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25643# Joint Publications Research Service, Arlington, Va.
NONAXISYMMETRIC DEFORMATION OF FLEXIBLE TOROIDAL SHELL WITH ELLIPTIC CROSS-SECTION Abstract Only
V. S. Demyanchuk *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 91-92 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1986 p 112-115 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25644# Joint Publications Research Service, Arlington, Va.
PARAMETRIC OPTIMIZATION OF PLASTIC CYLINDRICAL SHELLS WITH GEOMETRICAL NON-LINEARITY Abstract Only
Ya. A. Lellep *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 93 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 1, Jan.-Feb. 1985 p 138-146 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25645# Joint Publications Research Service, Arlington, Va.
PRECESSION OF NATURAL VIBRATION MODE IN SPHERICAL SHELL DURING ROTATION Abstract Only
V. F. Zhuravlev and A. L. Popov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 94 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 1, Jan. - Feb. 1985 p 147-151 Original language document announced in IAA as A85-28909 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25646# Joint Publications Research Service, Arlington, Va.
NATURAL VIBRATIONS OF CYLINDRICAL SHELL UNDER INITIAL EXTERNAL PRESSURE NONUNIFORMLY DISTRIBUTED OVER CIRCUMFERENCE Abstract Only
S. N. Kukudzhanov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 95-96 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 10, Oct. 1984 p 53-59 Original language document was announced in IAA as A85-16161 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25647# Joint Publications Research Service, Arlington, Va.
STABILITY OF MULTILAYER CYLINDRICAL SHELL UNDER EXTERNAL PRESSURE Abstract Only
A. N. Anidreyev *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 96-97 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 10, Oct. 1984 p 59-64 Original language document was announced in IAA as A85-16162 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25648# Joint Publications Research Service, Arlington, Va.
CYLINDRICAL SHELL WITH SLIT UNDER TENSION Abstract Only
M. Sh. Dyshel *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 97 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 10, Oct. 1984 p 64-69 Original language document was announced in IAA as A85-16163 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25649# Joint Publications Research Service, Arlington, Va.
AXISYMMETRIC CONTACT INTERACTION OF CYLINDRICAL SHELL AND ELASTIC ON RIGID HOUSING Abstract Only
W. Krzys and A. Moc *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 101 Transl. into ENGLISH from Problemy Prochnosti (Kiev, USSR), no. 1, Jan. 1985 p 90-96 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

42 GEOSCIENCES (GENERAL)

No abstracts in this category.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N86-25863*# National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
TIMBER RESOURCES INVENTORY AND MONITORING JOINT RESEARCH PROJECT
C. L. Hill Oct. 1985 35 p refs Prepared in cooperation with International Paper Co., Tuxedo Park, N.Y. Original contains color illustrations
(NASA-TM-88754; NAS 1.15:88754; ERL-237) Avail: NTIS HC A03/MF A01 CSCL 02F

Primary objectives were to develop remote sensing analysis techniques for extracting forest related information from LANDSAT Multispectral Scanner (MMS) and Thematic Mapper data and to determine the extent to which International Paper Company information needs can be addressed with remote sensing information. The company actively manages 8.4 million acres of forest land. Traditionally, their forest inventories, updated on a three year cycle, are conducted through field surveys and aerial photography. The results reside in a digital forest data base containing 240 descriptive parameters for individual forest stands. The information in the data base is used to develop seasonal and long range management strategies. Forest stand condition assessments (species composition, age, and density stratification) and identification of silvicultural activities (site preparation, planting, thinning, and harvest) are addressed. B.G.

N86-25864# Geoexplorers International, Inc., Denver, Colo.
GEOLOGICAL EVOLUTION AND ANALYSIS OF CONFIRMED OR SUSPECTED GAS HYDRATE LOCALITIES. VOLUME 1: BLAKE-BAHAMA OUTER RIDGE, US EAST COAST
J. Krason and W. I. Ridley Jun. 1985 114 p refs
(Contract DE-AC21-84MC-21181)
(DE86-001006; DOE/MC-21181/1950-Vol-1) Avail: NTIS HC A06/MF A01

This document is Volume 1 of a series of reports entitled Geological Evolution and Analysis of Confirmed or Suspected Gas Hydrate Localities. Volume 1 is an analysis of the Blake-Bahama Outer Ridge - US East Coast. This report presents a geological description of the Blake-Bahama Outer Ridge, including regional and local structural settings, geomorphology, geological history, stratigraphy, and physical properties. It provides the necessary regional and geological background for more in-depth research of the area. Detailed discussion of bottom simulating acoustic reflectors, sediment acoustic properties, distribution of hydrates within the sediments, and the relation of hydrate distribution to other features such as salt diapirism are also included. The formation and stabilization of gas hydrates in sediments are considered in terms of phase relations, nucleation, and crystallization constraints, gas solubility, pore fluid chemistry, inorganic diagenesis, and sediment organic content. Together with a depositional analysis of the area, this report is a better understanding of the thermal evolution of the locality. It should lead to an assessment of the potential for thermogenic hydrocarbon generation. DOE

N86-25865# Geoexplorers International, Inc., Denver, Colo.
GEOLOGICAL EVOLUTION AND ANALYSIS OF CONFIRMED OR SUSPECTED GAS HYDRATE LOCALITIES. VOLUME 2: BALTIMORE CANYON TROUGH AND ENVIRONS, US EAST COAST
J. Krason and W. I. Ridley Jun. 1985 138 p refs
(Contract DE-AC21-84MC-21181)
(DE86-001028; DOE/MC-21181/1950-Vol-2) Avail: NTIS HC A07/MF A01

This document is Volume 2 of a series of reports entitled Geological Evolution and Analysis of Confirmed or Suspected Gas Hydrate Localities. Volume 2 provides an analysis of the Baltimore Canyon Trough and Environs - US East Coast. The report presents a geological description of the Baltimore Canyon Trough region, including regional and local structural settings, geomorphology, geological history, stratigraphy, and physical properties. Included also is a discussion of bottom simulating acoustic reflectors, sediment acoustic properties, distribution of hydrates within the sediments, and the relation of hydrate distribution to other features such as salt diapirism. The formation and stabilization of gas hydrates in sediments are discussed in terms of phase relations, nucleation, and crystallization constraints, gas solubility, pore fluid chemistry, inorganic diagenesis, and sediment organic content. A depositional analysis of the area is discussed in order to better understand the thermal evolution of the locality and to assess the potential for thermogenic hydrocarbon generation. DOE

N86-25866*# Lunar and Planetary Inst., Houston, Tex.
THEMATIC MAPPER STUDIES OF ANDEAN VOLCANOES Monthly Report
P. W. Francis 1986 13 p Original contains color illustrations
(Contract NAS5-28759)
(NASA-CR-176807; NAS 1.26:176807; MR-6) Avail: NTIS HC A02/MF A01 CSCL 08K

The primary objective was to identify all the active volcanoes in the Andean region of Bolivia. Morphological features of the Tata Sabaya volcano, Bolivia, were studied with the thematic mapper. Details include marginal levees on lava and pyroclastic flows, and summit crater structure. Valley glacier moraine deposits, not easily identified on the multispectral band scanner, were also unambiguous, and provide useful marker horizons on large volcanic edifices which were built up in preglacial times but which were active subsequently. With such high resolution imagery, it is not only possible to identify potentially active volcanoes, but also to use standard photogeological interpretation to outline the history of individual volcanoes. B.G.

N86-25867# Ohio State Univ., Columbus. Research Foundation.
DIGITAL TERRAIN ELEVATION MODEL ANALYSIS Final Report, 28 Sep. 1984 - 28 Oct. 1985
Joseph C. Loon and Petros G. Patias Jul. 1985 105 p refs
(Contract DAAG29-81-D-0100)
(AD-A164305; OSURF-716042; ETL-0393) Avail: NTIS HC A06/MF A01 CSCL 08/6

An effort to develop techniques to evaluate contour-to-grid interpolation algorithms. The use of synthetic surfaces as tool is explored. A set of synthetic surfaces is generated using Fourier Series to represent terrain with different degrees of ruggedness; each surface represented by an equation of the form: $Z=F(X,Y)$. The results of a contour-to-grid interpolation can then be evaluated by comparison with the true elevations, the elevations calculated from the synthetic surfaces. Author (GRA)

N86-25868# Argonne National Lab., Ill.
RESULTS FROM A HIGH POWER, HIGH FREQUENCY SODAR
R. L. Coulter and T. J. Martin Oct. 1985 21 p refs Presented at the 3rd International Symposium on Acoustic Remote Sensing of the Atmosphere and Oceans, Paris, France, 14 Oct. 1985
(Contract W-31-109-eng-38)
(DE86-003041; CONF-8510214-2) Avail: NTIS HC A02/MF A01

The design and operation of a high power, portable minisodar operating at 3 to 7 kHz are described. Estimates of first and

second moments of vertical velocity made using this system are presented and some field applications described. DOE

N86-25869# Bureau of Land Management, Denver, Colo.
RUNOFF AND SOIL-LOSS MONITORING TECHNIQUE USING PAIRED PLOTS
W. L. Jackson, K. Knoop, J. Szalona, and S. Hudson Aug. 1985 28 p
(PB86-136694; BLM/YA/PT-85/005/4341; BLM/TN-368) Avail: NTIS HC A03/MF A01 CSCL 08H

Differences in annual runoff and soil loss caused by livestock grazing on arid rangelands can be measured directly from large plots. A low-cost monitoring technique is described which uses rectangular plots, collection tanks and cumulative mechanical stage-height counters. Annual runoff and soil loss are measured on paired grazed and ungrazed plots. The plots are replicated and the pairing provides a control. Thus the statistical validity of any differences between grazed and ungrazed plots can be assessed. The plots are easy to construct, and can be maintained with as few as one or two visits per year. The system is presently being tested at four separate locations. GRA

N86-25870# Geological Survey, Reston, Va. National Mapping Div.
US GEOLOGICAL DATA: DIGITAL LINE GRAPHS FROM 1:100, 000-SCALE MAPS. DATA USERS GUIDE 2
1985 79 p
(PB86-152261) Avail: NTIS HC A05/MF A01 CSCL 08B

The National Cartographic Information Center (NCIC) distributes digital cartographic/geographic data files produced by the U.S. Geological Survey (USGS) as part of the National Mapping Program. Digital cartographic data files may be grouped into four basic types. The first of these, called a digital line graph (DLG), is line map information in digital form. The second form, called a digital elevation model (DEM), consists of a sampled array of elevations for ground positions. The third type is land use and land cover digital data which provides information on nine major classes of land use such as urban, agricultural, or forest. The fourth type, the Geographic Names Information System, provides primary information for known places, features, and areas in the United States identified by a proper name. GRA

N86-25871# Argonne National Lab., Ill.
EXPLORATORY STUDIES ON DEEP EARTH SOURCES OF METHANE: Hg AS A DIAGNOSTIC AND PROSPECTING TOOL Annual Report, Apr. - Sep. 1985
G. W. Reed and S. Jovanovic 3 Oct. 1985 18 p refs
(Contract GRI-5084-260-1029)
(PB86-156148; Rept-2; GRI-85/0217) Avail: NTIS HC A02/MF A01 CSCL 21D

The venting of primordial volatiles to the Earth surface was determined. The proposition that the mantle is a major repository for juvenile methane was examined. Data on excess 3He, the only volatile generally accepted as being of mantle origin, are complemented. The gases (fluids) that serve as carriers for 3He might also be expected to transport volcanogenic trace volatiles such as Hg, Br, As, Sb, Se, Zn and Cu. The elements, representing a range of volatilities and geochemistries, are measured in tholeiitic glass samples from different ocean ridge and ocean island mantle sources, for which 3He data are available. A number of possible significant concentration trends and interelement correlations are observed. Tholeiitic magmas from diverse sources contain unfractionated Hg and Sb and covariant Zn and Cu. A primitive source is inferred for all the volatiles and their interrelation may complement the 3He mantle signature. It is suggested that Hg may accompany hydrocarbons from non-biogenic sources and may be used for prospecting. GRA

N86-25872# Bureau of Mines, Avondale, Md. Research Center.
PACIFIC MANGANESE NODULES: CHARACTERIZATION AND PROCESSING
B. W. Haynes, S. L. Law, D. C. Barron, G. W. Kramer, and R. Maeda 1985 50 p refs
(PB86-150919; BM-B-679; LC-85-600142) Avail: NTIS HC A03/MF A01 CSCL 11F

The Bureau of Mines conducted research to provide technical information needed to devise waste management plans for the processing of manganese nodules. Studies included summary description of Pacific manganese nodules, process options and flowsheets, methods for characterizing nodules and their tailings, and results of analyses of laboratory and pilot-plant generated tailings. This information is the result of a cooperative research effort of the Bureau of Mines and the National Oceanic and Atmospheric Administration (NOAA), with NOAA providing funding and the Bureau conducting the research. A summary of the extensive literature review is provided for manganese nodule mineralogy, chemistry, processing techniques, and methods of analyses. Characterizations and analyses of laboratory-generated tailings and slags are given, as well as the results of the leaching studies on these waste materials. GRA

N86-25873*# National Academy of Sciences - National Research Council, Washington, D. C.
REMOTE SENSING OF THE EARTH FROM SPACE: A PROGRAM IN CRISIS Final Report
Dec. 1985 111 p Sponsored in part by National Academy of Sciences - National Research Council, Washington, D.C. Prepared in cooperation with NOAA, Rockville, Md.
(Contracts NASw-3706; NA83DA-C-00013)
(NASA-CR-176796; NAS 1.26:176796; PB86-152923) Avail: NTIS HC A06/MF A01 CSCL 05A

The present situation in earth remote sensing, determining why certain problems exist, and trying to find out what can be done to solve these problems are discussed. The conclusion is that operational remote sensing is in disarray. The difficulties involve policy and institutional issues. Recommendations are given. Author

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N86-25874* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
OXYGEN RECOMBINATION IN INDIVIDUAL PRESSURE VESSEL NICKEL-HYDROGEN BATTERIES Patent
John J. Smithrick, inventor (to NASA) Issued 22 Apr. 1986 6 p Filed 27 Jun. 1984 Sponsored by NASA
(NASA-CASE-LEW-13822-1; US-Patent-4,584,249;
US-Patent-Appl-SN-625077; US-Patent-Class-429-57;
US-Patent-Class-429-27; US-Patent-Class-42-101) Avail: US Patent and Trademark Office CSCL 10C

A metal-hydrogen cell is described which avoids damage and retards flooding of the hydrogen electrodes by providing for chemical recombination of oxygen and hydrogen in areas or sites remote from the hydrogen electrodes. In the metal-hydrogen cell, a plurality of electrical cell units are place in a back to back relationship. The cells may be lined with a wick, having one or more catalyzed sites on the inner surface of the cell. Separators disposed between the respective metal and hydrogen electrodes of each cell unit are provided with gas directing notches around their peripheries to facilitate the desired movement of gases within the metal-hydrogen cell. Any two metal electrodes separated by a gas screen are provided with gas tight sealing means between the electrodes at each aperature. The sealing means may be a

ring of rubber or elastomeric material which is somewhat compressible but nonreactive with other materials in the cell. B.G.

N86-25875*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
POWER SYSTEM APPLICATIONS OF FIBER OPTICS
H. Kirkham, A. Johnston, G. Lutes, T. Daud, and S. Hyland Mar. 1984 180 p refs
(Contracts NAS7-918; DE-AI01-79ET-29372)
(NASA-CR-176831; JPL-Publ-84-28; NAS 1.26:176831; DOE/ET-29372/4) Avail: NTIS HC A09/MF A01 CSCL 10A

Power system applications of optical systems, primarily using fiber optics, are reviewed. The first section reviews fibers as components of communication systems. The second section deals with fiber sensors for power systems, reviewing the many ways light sources and fibers can be combined to make measurements. Methods of measuring electric field gradient are discussed. Optical data processing is the subject of the third section, which begins by reviewing some widely different examples and concludes by outlining some potential applications in power systems: fault location in transformers, optical switching for light fired thyristors and fault detection based on the inherent symmetry of most power apparatus. The fourth and final section is concerned with using optical fibers to transmit power to electric equipment in a high voltage situation, potentially replacing expensive high voltage low power transformers. JPL has designated small photodiodes specifically for this purpose, and fabricated and tested several samples. This work is described. Author

N86-25876# General Electric Co., Syracuse, N.Y. Power Electronics Semiconductor Dept.
GaAs SOLAR CELL WITH LOW SURFACE RECOMBINATION Final Subcontract Report
J. R. Shealy, P. A. McDonald, J. L. Benjamin, and D. K. Wagner Nov. 1985 24 p
(Contract DE-AC02-83CH-10093)
(DE85-016879; SERI/STR-211-2811) Avail: NTIS HC A02/MF A01

The fabrication of large-area solar cells (0.16 sq cm) on GaAs and AlGaAs structures with a new passivating coating, pyrolytic Si3N4, is demonstrated. Results in this study illustrate a near-oxide-free interface between GaAs and the Si3N4 coatings. These coatings were applied to three solar cell structures, a heteroface AlGaAs/GaAs cell, a graded band-gap AlGaAs cell, and a diffused homojunction cell. The results indicate that the pyrolytic Si3N4 coatings improve the surface (high energy) response of homojunction cells; however, they do not perform as well as cells with AlGaAs window layers on the surface. As a result, little improvement in the heteroface solar cell high-energy response was observed in this study. The best solar cells fabricated in this study with Si3N4 coatings were heteroface structures whose 1-sun, AMO conversion efficiencies were as high as 14.6%. DOE

N86-25877*# Engelhard Corp., Edison, N.J. Specialty Chemicals Div.
DEVELOP AND TEST FUEL CELL POWERED ON-SITE INTEGRATED TOTAL ENERGY SYSTEMS Interim Report, Feb. 1981 - Jan. 1984
A. Kaufman and J. Werth Oct. 1984 236 p
(Contracts DEN3-241; DE-AI01-80ET-17088)
(NASA-CR-174951; DOE/NASA-0241-12; NAS 1.26:174951) Avail: NTIS HC A11/MF A01 CSCL 10B

Work has been performed leading toward the development of a 50kW on-site integrated energy system. A sub-scale 5kW system was constructed and tested in the steady-load (with shutdowns) and transient modes. A parallel effort has been conducted to develop the full-size sub-systems for the on-site system; these include the fuel cell stack, a methanol processor, and a d.c.-a.c. power conditioner. Stack technology development activities have been carried out to improve the performance, cost and reliability of stack components and hardware. In the fuel processing area, screening tests have been conducted for various methanol steam-reforming catalysts, and the preferred catalysts have been subjected to extended testing. Application-related work has been pursued largely under subcontracts. A study has been completed in which the applicability of on-site fuel cell cogeneration systems to various building types was analyzed and the potential economic attractiveness ascertained. The overall system was analyzed in terms of its operating characteristics at part load and its response to transients. Preferred heating, ventilating, and air conditioning approaches for various building types using fuel cell cogeneration units are determined. Author

N86-25878# Energy Research Corp., Danbury, Conn.
FUEL PROCESSING SYSTEM FOR A 5 kW METHANOL FUEL CELL POWER UNIT Final Report, 20 Sep. 1984 - 20 Sep. 1985
G. Steinfeld 27 Nov. 1985 107 p
(Contract DAAK70-84-C-0099; DA Proj. 1V4-63702-DG-11)
(AD-A163636) Avail: NTIS HC A06/MF A01 CSCL 07/1

This report documents the development and design of a 5kW heat methanol reformer for phosphoric acid fuel cell power plants. The reformer design was based on utilizing burner exhaust as the source of water required for reforming. This approach was arrived at after evaluation of several system options. A developmental unit was tested, and test data is documented indicating that all design objectives were met except for start-up time. GRA

N86-25879# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
STUDY OF BIPOLAR NICKEL-CADMIUM BATTERIES AS PULSED LOAD FILTERS M.S. Thesis
Robert W. Chedister and John M. Ulmer Nov. 1985 135 p refs
(AD-A163949; AFIT/GE/ENG/85D-6) Avail: NTIS HC A07/MF A01 CSCL 10/3

Bipolar nickel-cadmium batteries were designed, built, and tested for possible use as capacitive filter elements in pulsed power applications. Electrodes were made by electrochemically impregnating sintered sides of nickel cell walls. Four-cell batteries were constructed by compressing the electrodes together with Teflon seals. A computer controlled test circuit charged and discharged the test batteries at frequencies of 1 to 50 Hertz and at depths of discharge of less than one percent. A special test battery was constructed with a removeable cadmium electrode for scanning electron microscope study. Battery energy density, effective capacitance, and efficiency were investigated as a function of current load or depth of discharge, cycle rate, and end of discharge voltage. Energy densities of nearly 75 joules per pound were demonstrated. Current loads of up to a 100 C-rate were demonstrated and an average capacitance of 6 farads was achieved. Cadmium electrode morphology was photographed and studied as a function of the charge and discharge cycle life with no crystalline anomalies discovered. Sinter corrosion, nickel electrode overcharging, and individual cell voltages were discovered as areas for further study. Author (GRA)

N86-25880# Pennsylvania State Univ., University Park. Dept. of Materials Science and Engineering.
EXPERIMENTAL AND THEORETICAL STUDIES ON TRANSPORT PROCESSES IN LASER WELDING Progress Report
T. DebRoy 15 Apr. 1986 44 p
(Contract DE-FG02-84EG-45158)
(DE86-002953; DOE/ER-45158/2) Avail: NTIS HC A03/MF A01

Although lasers are utilized for various materials processing applications, laser welding is not an acceptable procedure for certain alloys. If an alloy contains one or more volatile components, selective vaporization of relatively more volatile components during laser welding may lead to inadequate control of the weld composition and poor mechanical properties of the fabricated product. The loss of alloying elements and the eventual properties of the weld zone are influenced by fluid flow in the weld pool, heat transfer and the thermodynamics and the kinetics of the vaporization of various components from the molten pool. In order to understand and eventually control the alloying element loss from the laser melted pool an experimental and theoretical program of

studies was initiated at Penn State in August 1984. This report documents the progress made to date on this grant. DOE

N86-25881# Khorsand (Hossein), Eagle, Idaho.
POINT FOCUS PARABOLIC SOLAR COLLECTOR
Hossein Khorsand 29 Jan. 1985 81 p
(Contract DE-FG01-82CE-15088)
(DE86-003001; DOE/CE-15088/T2) Avail: NTIS HC A05/MF A01

The purpose of this project was to analyze and design a point focus parabolic collector. The analysis of a 15 meters diameter dish using finite elements computer programs shows high rigidity to weight ratio. A 15 meter dish weighs 7600 lb (excluding reflective surface), and when it is supported at three equally spaced support points, maximum deflection is .070 inch under a combined self, reflector, and receiver weight of 10,500 pounds. The dish subjected to wind loads at various elevation and azimuth angles showed good rigidity. Subsequently a detailed design of the dish followed. Most of the members of the structure are prefabricated in individual trusses to be assembled at the site. The structure for tracking also was analyzed. Design of tracking structure and foundation is not complete. A programmable electronic control system was designed for controlling the drive motors. The results of this project confirms the weight and cost saving which had been anticipated. DOE

N86-25882# Los Alamos National Lab., N. Mex.
HIGH-TEMPERATURE BOREHOLE INSTRUMENTATION
B. R. Dennis, S. P. Koczan, and E. L. Stephani Oct. 1985 49 p refs
(Contract W-7405-eng-36)
(DE86-00438; LA-10558-HDR) Avail: NTIS HC A03/MF A01

A new method of extracting natural heat from the Earth's crust was invented at the Los Alamos National Laboratory in 1970. It uses fluid pressures (hydraulic fracturing) to produce cracks that connect two boreholes drilled into hot rock formations of low initial permeability. Pressurized water is then circulated through this connected underground loop to extract heat from the rock and bring it to the surface. The creation of the fracture reservior began with drilling boreholes deep within the Precambrian basement rock at the Fenton Hill Test Site. Hydraulic fracturing, flow testing, and well-completion operations required unique wellbore measurements using downhole instrumentation systems that would survive the very high borehole temperatures, 320(0)C (610(0)F). These instruments were not available in the oil and gas industrial complex, so the Los Alamos National Laboratory initiated an intense program upgrading existing technology where applicable, subcontracting materials and equipment development to industrial manufactures, and using the Laboratory resources to develop the necessary downhole instruments to meet programmatic schedules. DOE

N86-25883# Technical Planning, Inc., Bethesda, Md.
PHOTOVOLTAIC DRIVEN VAPOR COMPRESSION CYCLES Final Report
D. K. Anand 1985 57 p
(Contract DE-AC03-84SF-11997)
(DE86-001702; DOE/SF-11997/T1) Avail: NTIS HC A04/MF A01

Since the vast majority of heat pumps, air conditioning and refrigeration equipment employs the vapor compression cycle (VCC), the use of renewable energy represents a significant opportunity. As discussed in this report, it is clear that the use of photovoltaics (PV) to drive the VCC has more potential than any other active solar cooling approach. This potential exists due to improvements in not only the PV cells but VCC machinery and control algorithms. It is estimated that the combined improvements will result in reducing the PV cell requirements by as much as one half. DOE

N86-25884# California Univ., San Diego, La Jolla.
ASSESSMENT OF RESEARCH NEEDS FOR ADVANCED FUEL CELLS
S. S. Penner Jul. 1985 237 p
(Contract DE-AC01-84ER-30060)
(DE86-002003; DOE/ER-30060/T1) Avail: NTIS HC A11/MF A01

The DOE Advanced Fuel Cell Working Group (AFCWG) was formed and asked to perform a scientific evaluation of the current status of fuel cells, with emphasis on identification of long-range research that may have a significant impact on the practical utilization of fuel cells in a variety of applications. Surveys describing the salient features of individual fuel cell types include elaborations of long-term research needs relating to the expeditious introduction of improved fuel cells. The Introduction and Summary always represent a majority view and, occasionally, a unanimous judgment. Chapters 2 to 6 provide background information and carry the names of identified authors. The identified authors of Chapters 2 to 6, rather than AFCWG as a whole, bear full responsibility for the scientific and technical contents of these chapters. DOE

N86-25885# Department of Energy, Washington, D. C. Off. of the Dep. Asst. Sec. for Renewable Energy.
RENEWABLE ENERGY RESEARCH AND DEVELOPMENT OUTLOOK, VOLUME 2
Dec. 1985 161 p
(Contract DE-AC05-81OR-20837)
(DE86-004536; DOE/OR-20837/4-Vol-2) Avail: NTIS HC A08/MF A01

Renewable energy technologies represent a significant opportunity to increase diversity and flexibility within the energy supply system. This report (Volumes 1 and 2) presents a recent evaluation conducted by the Department of Energy to: (1) gauge the potential payoff of numerous renewable energy technology options, (2) prioritize research and development activities meeting technology development objectives obtainable over the next five years, and (3) evaluate the Government's role in performing these activities. Volume 2 contains appendices which discuss detailed data that support the method and conclusions discussed in Volume 1. This study was performed to develop five year R and D directions for the broad family of renewable energy technologies. The study included a calculation of the energy contribution potential (ECP) of each technology, a structured evaluation of the effectiveness of potential R and D activities in meeting critical technology development objectives and an evaluation of the appropriate federal role in each detailed R and D activity. DOE

N86-25886# Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
PASSIVE SOLAR/GAS TECHNOLOGY CHARACTERIZATION AND DEVELOPMENT Final Report, Dec. 1982 - Mar. 1985
P. J. Burns, A. T. Kirkpatrick, and C. B. Winn Aug. 1985 141 p
(Contract GRI-5082-243-0728)
(PB86-168796; GRI-85/0244) Avail: NTIS HC A07/MF A01 CSCL 13A

Presented is the methodology used to (1) determine annual energy usage for passive solar buildings; (2) balance the amounts of auxiliary energy, passive solar features, and conservation (levels of insulation); and (3) size zone heating radiant panel units for passive solar buildings. The methodology focuses upon the building as a system with a life cycle costing approach encompassing capital equipment costs, installation costs, and energy costs. Thus, a comparison of gas versus electric systems is possible which includes these effects. The manual includes some 50 different types of passive solar systems in 50 different locations across the continential United States. GRA

N86-25887# Columbia Gas System Service Corp., Columbus, Ohio.
DOUBLE EFFECT ABSORPTION HEAT PUMP, PHASE 2 AND 2A Final Report, Oct. 1982 - May 1984
F. B. Cook, S. P. Cremean, S. C. Jatana, R. A. Johnson, and N. D. Malcosky 30 Sep. 1984 153 p
(Contract GRI-5080-341-0344)
(PB86-163722; GRI-81/0098.1) Avail: NTIS HC A08/MF A01 CSCL 13A

The objective is research, development and demonstration of a double-effect generator cycle absorption heat pump for the residential and small commerical markets. A 3RT advanced breadboard air-to-air reverse cycle heat pump was designed, fabricated and tested and the heating and cooling targets were achieved. The parasitic power consumption targets were not demonstrated in these phases. The refrigerant generator/heat exchanger subsystem, the interface heat exchangers and prototype solution pumps based on three different pumping technologies were designed, fabricated, tested and delivered by Columbia subcontractors. Development of a packaged prototype heat pump based on components and subsystems designed in these phases is recommended. GRA

N86-25528# Joint Publications Research Service, Arlington, Va.
PERIODIC OPTICAL FARADAY-EFFECT CHOPPER Abstract Only
N. I. Gavrilov, A. M. Godes, V. Kh. Krupkin, A. L. Levit, and V. M. Ovchinnikov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 58 refs Transl. into ENGLISH from Optiko-Mekhanicheskay Promyshlennost (USSR), no. 1, Jan. 1985 p 17-19 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

N86-25604# Joint Publications Research Service, Arlington, Va.
TECHNICAL-ECONOMIC FEASIBILITY OF ORBITING SUNLIGHT REFLECTORS Abstract Only
Zh. Alferov and V. Minin *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 26-27 Transl. into ENGLISH from NTR: Problemy i Resheniya (Moscow, USSR), 19 Feb. 1985 p 6 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25611# Joint Publications Research Service, Arlington, Va.
ROBOT DRIVE MECHANISM USES CONVENTIONAL ELECTRIC MOTORS Abstract Only
I. Demchenko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 44-45 Transl. into ENGLISH from Sotsialisticheskaya Industriya (Moscow, USSR), 16 May 1985 p 4 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N86-25888# Argonne National Lab., Ill.
FORECASTING TRANSPORTATION ACTIVITY AND EMISSIONS FOR THE NATIONAL ACID PRECIPITATION ASSESSMENT PROGRAM
C. L. Saricks and A. D. Vyas 1985 39 p refs Presented at the 65th Annual Meeting of the Transportation Research Board, Washington, D.C., 20 Jan. 1986
(Contract W-31-109-eng-38)
(DE85-018352; CONF-860113-1) Avail: NTIS HC A03/MF A01

Transportation sources of three acid rain precursor pollutants (oxides of nitrogen, or NO/sub x/; volatile organic compounds, or VOC, and sulfur dioxide, or SO2) contribute significantly to their atmospheric loading. The main objectives of modeling these emissions for the 1985 National Acid Precipitation Assessment Program (NAPAP) are to (1) develop state-by-state projections of these precursor pollutants and (2) incorporate in the forecasting scheme the capability to model the effects of currently programmed and planned strategies on pollutant loading. The Transportation Energy and Emissions Modeling System (TEEMS) was used to develop the desired projections from NAPAP economic driver outputs. This system is a technology-based modeling package, the activity forecasting module of which has three major components: (1) a local personal-travel model, (2) an intercity passenger travel model, and (3) a freight activity projection model. The emissions module in TEEMS uses US EPA's MOBILE3 model and AP-42 factors to estimate state level emissions from national data. Results from the NAPAP reference scenario indicate an increase in transportation activity at a rapid rate during 1985 to 2000, but at a slow rate during 2000 to 2030. Transportation VOC emissions will fall to 59% of their 19 85 level by 2000 due to government emission regulation, but will increase after 2000. Emissions of NO/sub x/ will drop slightly, to 93% of the 1985 level by 1995, and then grow to 131% of the 1985 level by 2030. This rise is due to the lack of regulation for off-highway vehicles and to greatly increased activity by heavy diesel trucks. Emissions of SO2 will continue to increase for the same reasons, augmented by the rise in sulfur content of residual fuel. DOE

N86-25889# Pacific Northwest Lab., Richland, Wash.
COMPARISON OF A MULTILAYER REGIONAL-SCALE ACID RAIN ASSESSMENT MODEL (MLRAPT) WITH A SINGLE-LAYER ASSESSMENT MODEL, RAPT
W. E. Davis and C. S. Glantz Aug. 1985 24 p refs Presented at the Muskoka Conference: International Symposium on Acidic Precipitation, Toronto, Ontario, 14-18 Sep. 1985
(Contract DE-AC06-76RL-01830)
(DE86-004862; PNL-SA-13028; CONF-850944-4) Avail: NTIS HC A02/MF A01

Uncertainty due to treating transport processes using a single-layer model compared to a multilayer model was examined. MLRAPT uses isentropic layers to characterize advection of SO2 and SO(2-)4 in either a multilayer mode, where both horizontal and vertical transport are calculated, or a single-layer mode, where only horizontal transport is considered. Comparison between the two modes indicated that the average air concentrations were highly correlated (a correlation coefficient of 0.95). However, for wet deposition of SO(2-)4, a correlation coefficient of 0.55 between the two predicted wet deposition fields was obtained. Results of the comparison of the two modes, the observed air concentration fields, and limited comparison of observed and predicted wet deposition have implications on using a single-layer model to develop source/receptor relationships. DOE

N86-25890# Oak Ridge National Lab., Tenn.
ACIDIC DEPOSITION: EFFECTS ON AGRICULTURAL CROPS Final Report, Apr. 1980 - 31 Dec. 1984
D. S. Shriner, J. W. Johnston, Jr., G. E. Taylor, Jr., R. J. Luxmoore, R. K. McConathy, S. B. McLaughlin, A. S. Heagle, R. J. Norby, B. K. Takemoto, and D. T. Dubay May 1985 145 p
(Contract DE-AC05-84OR-21400)
(DE86-004943; ORNL/M-82) Avail: NTIS HC A07/MF A01

The report presents the results of research on soybean response to simulated wet and dry deposition, and field studies of growth, yield, and physiological response to a characterized air quality. Separate abstracts have been prepared for individual papers. DOE

N86-25891# Oak Ridge National Lab., Tenn.
COMPARATIVE EVALUATION OF THE EFFECTS OF ACID PRECIPITATION, NATURAL ACID PRODUCTION AND HARVESTING ON CATION REMOVAL FROM FORESTS
D. W. Johnson Dec. 1985 111 p
(Contract DE-AC05-84OR-21400)
(DE86-005345; ORNL/TM-9706) Avail: NTIS HC A06/MF A01

The effects of acid deposition, natural leaching, and harvesting on base cation export from coniferous forests in Maine, coniferous and deciduous forests in Tennessee, a coniferous forest in South Carolina, a deciduous forest in North Carolina, and coniferous and deciduous forests in Washington were compared. Sulfate dominated leaching in the Tennessee sites, whereas HCO3(-) dominated leaching in the Maine, North Carolina, South Carolina, and Washington sites. Nitrate leaching was negligible in all but a red alder site in Washington where nitrogen fixation resulted in net NO3(-) leaching. Total base cation export by leaching exceeded Ca(2+) + Mg(2+) + K(+) export that results from whole-tree harvesting in most sites. Leaching, however, even as augmented by acid deposition, does not appear to pose an imminent threat

to soil base cation supplies on these sites because soil base cation reserves are very large relative to leaching rates. Some sites showed a net Ca(2+) or K(+) accumulation from atmospheric deposition until they were subjected to whole-tree harvesting. It is concluded that leaching need not cause a net export of all nutrient cations, even if total base cation export is accelerated by acid deposition. DOE

N86-25892# Environmental Protection Agency, Research Triangle Park, N.C. Emission Standards and Engineering Div.
OPACITY PROVISIONS: BACKGROUND INFORMATION FOR PROMULGATED AMENDMENTS Final Report
Dec. 1985 48 p
(PB86-147899; EPA-450/3-85-013) Avail: NTIS HC A03/MF A01 CSCL 13B

The promulgated opacity provisions require owners or operators of affected facilities that are subject to opacity standards in 40 CFR Part 60 to record and report the opacity of emissions during the initial performance test. These provisions implement Section 114 of the Clean Air Act. GRA

N86-25893# Environmental Protection Agency, Research Triangle Park, N.C. Air and Energy Engineering Research Lab.
HIGH REACTIVITY SORBENTS FOR SO2 CONTROL
D. C. Drehmel, D. A. Kirchgessner, and S. L. Rakes Jan. 1986 45 p refs
(PB86-145794; EPA-600/D-86-009) Avail: NTIS HC A03/MF A01 CSCL 13B

Studies relating to air pollution control from coal-fired utility boilers show that the primary variable affecting sorbent reactivity at high temperature or at low temperature with water droplets is surface area. For the development of high surface area during furnace injection, some limestones appear to be superior to others and can be selected accordingly. Even more striking are the differences in surface area development and sulfur capture between classes of commercially available sorbents. Dolomitic sorbents generally outperform their calcitic counterparts, and hydrates are clearly preferable to carbonates on the basis of SO2 capture. It has been shown further that sorbents can be modified in a number of ways to enhance their performance. Limestones can be precalcined to high surface areas and injected downstream from the burner to preserve their reactivity. Calcitic materials can be pressure hydrated to increase their reactivity over atmospheric hydrates, and hydration parameters can apparently be adjusted to increase reactivity even further. GRA

N86-25894# National Center for Atmospheric Research, Boulder, Colo.
PRIMARY PHOTOCHEMICAL PROCESSES OF ACROLEIN Final Report
E. P. Gardner, P. D. Sperry, and J. G. Calvert Jan. 1986 104 p refs Sponsored in part by EPA, Research Triangle Park, N.C.
(PB86-145802; EPA-600/3-85/005) Avail: NTIS HC A06/MF A01 CSCL 07E

Pollutants are removed from the atmosphere in a number of ways: they can react with OH and O3, they can be dry and wet deposited, photodissociate through solar radiation, or they can be biodegraded. The report presents the photodissociation processes of acrolein. Quantum yields of acrolein loss are given. The dominant reactions in the lower troposphere are the formation of C2H4 and CO. Also produced are CH2-CHCHO, H, CH2CH, and HCO radicals but at lower quantum yields. Since the OH attack on acrolein is quite large (1.9 x 10 to the -11th power cu cm/molecules) ambient levels of OH (about 10 the 6th power molecules/cu cm) will remove acrolein very rapidly usually, about 15 hours. Thus, the major loss mechanism of acrolein in the troposphere is through OH attack and the photodissociation process is of negligible importance. GRA

N86-25895# Pacific Environmental Services, Inc., Durham, N.C.
EVALUATION OF CONTROL TECHNOLOGIES FOR HAZARDOUS AIR POLLUTANTS, VOLUME 1 Final Report, Aug. 1984 - Oct. 1985
R. Y. Purcell and G. S. Shareef Feb. 1986 368 p refs Prepared in cooperation with Radian Corp., Research Triangle Park, N.C. (Contract EPA-68-02-3981)
(PB86-167020; EPA-600/7-86/009A) Avail: NTIS HC A16/MF A01 CSCL 13B

The manual is an aid to EPA regional, state, and local air pollution control agency technical personnel in selecting, evaluating, and developing costs of air pollution control techniques for reducing or eliminating the emission of potentially hazardous air pollutants (HAPs) from industrial/commercial sources. It contains information that should be useful for reviewing permit applications or for informing interested parties as to the type, basic design, and cost of available HAP control systems. Since the definition of a HAP is very broad (encompasses potentially thousands of compounds), it is not possible for the handbook to include an all-inclusive list of HAP compounds and compound-specific control techniques. However, there are only a few available generic air pollution control techniques, and the factors affecting their cost and performance as applied to many noncriteria pollutants have been identified and discussed in the literature. GRA

N86-25896# Environmental Protection Agency, Research Triangle Park, N.C. Environmental Criteria and Assessment Office.
AIR QUALITY CRITERIA FOR OZONE AND OTHER PHOTOCHEMICAL OXIDANTS, EXTERNAL REVIEW DRAFT NO. 2, VOLUME 5
D. H. Horstman, S. M. Horvath, and J. A. Raub Nov. 1985 319 p refs
(PB86-155652; EPA-600/8-84-020B-5) Avail: NTIS HC A14/MF A01 CSCL 13B

Scientific information is presented and evaluated relative to the health and welfare effects associated with exposure to ozone and other photochemical oxidants. Although not intended as a complete and detailed literature review, the document covers pertinent literature through early 1985. Data on health and welfare effects are emphasized, but additional information is provided for understanding the nature of the oxidant pollution problem and for evaluating the reliability of effects data as well as their relevance to potential exposures to ozone and other oxidants at concentrations occurring in ambient air, information is presented on the following exposure-related topics: nature, source, measurement, and concentrations of precursors to ozone and other photochemical oxidants; formation of ozone and other photochemical oxidants and their transport once formed; properties, chemistry, and measurement of ozone and other photochemical oxidants; and concentrations of ozone and other photochemical oxidants typically found in ambient air. GRA

N86-25897# Environmental Protection Agency, Research Triangle Park, N.C. Environmental Criteria and Assessment Office.
AIR QUALITY CRITERIA FOR OZONE AND OTHER PHOTOCHEMICAL OXIDANTS, EXTERNAL REVIEW DRAFT NO. 2, VOLUME 1
R. M. Adams, H. J. B. Garner, J. A. Graham, D. E. Gardner, and D. H. Horstman Nov. 1985 233 p refs
(PB86-155645; EPA-600/8-84-020B-1) Avail: NTIS HC A11/MF A01 CSCL 13B

Scientific information is presented and evaluated as it relates to the health and welfare effects associated with exposure to ozone and other photochemical oxidants. Although not intended as a complete literature review, the document covers relevant literature through early 1985. Data on health and welfare effects are emphasized, but additional information is provided for understanding the nature of the oxidant pollution problem and for evaluating the reliability of effects data as well as their relevance to potential exposures to ozone and other oxidants at concentration occurring in ambient air. Information is presented on the following exposure-related topics: nature, source, measurement, and concentrations of precursors to ozone and other photochemical oxidants; formation of ozone and other photochemical oxidants and their transport once formed; properties, chemistry, and measurement of ozone and other photochemical oxidants; and

concentrations of ozone and other photochemical oxidants typically found in ambient air. GRA

N86-25898# American Association for the Advancement of Science, Washington, D.C. Office of Public Sector Programs.
RESEARCH NEEDS IN BIOTECHNOLOGY AND THE ENVIRONMENT Final Report
Nov. 1985 184 p refs Workshop held in Berkeley Springs, W. Va., 29 Apr. - 1 May 1984 Sponsored by EPA
(PB86-158979) Avail: NTIS HC A09/MF A01 CSCL 06B

The report presents the results of a workshop convened by the American Association for the Advancement of Science and the U.S. Environmental Protection Agency to examine research needs in biotechnology and the environment. The workshop was held at Coolfont Conference Center, Berkeley Springs, West Virginia, 29 April - 1 May 1984. Four draft papers prepared by EPA staff on environmental effects, health effects, monitoring and quality assurance and control technologies - served to focus discussions at the workshop. Two of these papers, revised following the workshop, are included in the report. In the two other cases, the workshop review groups, and AAAS and EPA staff determined that supplementary papers by outside individuals were warranted in order to better treat the issues considered at the workshop. The report, therefore, represents a blend of the workshop discussions and papers and work performed subsequently. GRA

N86-25899# Research Triangle Inst., Research Triangle Park, N.C.
MICROCOMPUTER PROGRAMS FOR PARTICULATE CONTROL: DOCUMENTATION Final Report, Jan. - Jun. 1985
M. K. Owen and A. S. Viner Sep. 1985 381 p refs Sponsored by EPA
(PB86-146529; EPA-600/8-85-025A; EPA/SW/DK-86/009A) Avail: NTIS HC A14/MF A01 CSCL 13B

The report describes the development of a set of programs especially for air-pollution related problems. (The phenomenal growth of the microcomputer industry has made it possible for anyone in industry to have a relatively fast and easy-to-use computer. Unfortunately, the specialized software needs of the air pollution community have not been met.) The report describes: microcomputer programs of electrostatic precipitator performance, an implementation of the GCA/EPA baghouse model; an in-stack opacity prediction program; and a plume opacity model. User benefits, hardware/software requirements, and general restrictions are given, as well as brief descriptions of the theoretical models. A sample problem, which gives detailed instructions on how to use the menu and obtain desired results, is included for each program. Author (GRA)

N86-25550# Joint Publications Research Service, Arlington, Va.
DRY VACUUM DISTILLATION DISCUSSED
Yunfu Mei and Naibo Gou *In its* China Report: Science and Technology (JPRS-CST-86-011) 31 Mar. 1986 p 78-84 refs Transl. into ENGLISH from Huaxue Shijie (Shanghai, China), v. 25, no. 9, 20 Sep. 1984 p 334-336 (For primary document see N86-25547 16-31)
Avail: NTIS HC A07/MF A01

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N86-25900*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
COMPENDIUM OF METEOROLOGY SCIENTIFIC ISSUES OF 1950 STILL OUTSTANDING
William W. Vaughan Apr. 1986 59 p refs
(NASA-RP-1167; NAS 1.61:1167) Avail: NTIS HC A04/MF A01 CSCL 04A

The Compendium of Meteorology was published in 1951 by the American Meteorological Society. A review was made of the Compendium of Meteorology to identify the studies and future needs which the authors expressed in their papers. The needs as seen by the authors are organized into sections and papers following the format of the Compendium of Meteorology. In some cases the needs they identified are as valid today as they were in 1951. In other cases one will easily be able to identify examples where significant progress has been made. It is left to the individual scientists and scientific program managers to assess whether significant progress has been made over the past thirty-five years on these outstanding scientific issues. Author

N86-25901*# Lunar and Planetary Inst., Houston, Tex.
WORKSHOP ON THE TECTONIC EVOLUTION OF GREENSTONE BELTS (SUPPLEMENT CONTAINING ABSTRACTS OF INVITED TALKS AND LATE ABSTRACTS)
1986 38 p refs Workshop held in Houston, Tex., 16-18 Jan. 1986
(Contract NASw-4066)
(NASA-CR-176621; NAS 1.26:176621; LPI-Contrib-584-Suppl) Avail: NTIS HC A03/MF A01 CSCL 08G

Topics addressed include: greenstone belt tectonics, thermal constaints, geological structure, rock components, crustal accretion model, geological evolution, synsedimentary deformation, Archean structures and geological faults. For individual titles, see N86-25902 through N86-25910.

N86-25902*# Cambridge Univ. (England). Dept. of Earth Sciences.
GREENSTONE BELT TECTONICS: THERMAL CONSTRAINTS
M. J. Bickle and E. G. Nisbet (Saskatchewan Univ., Saskatoon.) *In* Lunar and Planetary Inst. Workshop on the Tectonic Evolution of Greenstone Belts 1986 p 1-7 refs (For primary document see N86-25901 16-46)
Avail: NTIS HC A03/MF A01 CSCL 08G

Archaean rocks provide a record of the early stages of planetary evolution. The interpretation is frustrated by the probable unrepresentative nature of the preserved crust and by the well known ambiguities of tectonic geological synthesis. Broad constraints can be placed on the tectonic processes in the early Earth from global scale modeling of thermal and chemical evolution of the Earth and its hydrosphere and atmosphere. The Archean record is the main test of such models. Available general model constraints are outlined based on the global tectonic setting within which Archaean crust evolved and on the direct evidence the Archaean record provides, particularly the thermal state of the early Earth. Author

N86-25903*# Louisiana State Univ., Baton Rouge. Dept. of Geology.
THE ROCK COMPONENTS AND STRUCTURES OF ARCHEAN GREENSTONE BELTS: AN OVERVIEW
Donald R. Lowe and Gary R. Byerly *In* Lunar and Planetary Inst. Workshop on the Tectonic Evolution of Greenstone Belts 1986 p 9-13 refs (For primary document see N86-25901 16-46)
Avail: NTIS HC A03/MF A01 CSCL 08G

Knowledge of the character and evolution of the Earth's early crust is derived from the studies of the rocks and structures in Archean greenstone belts. Ability to resolve the petrologic, sedimentological and structural histories of greenstone belts, however, hinges first on an ability to apply the concepts and procedures of classical stratigraphy. Unfortunately, early Precambrian greenstone terrains present particular problems to stratigraphic analysis. Many current controversies of greenstone belt petrogenesis, sedimentology, tectonics and evolution arise more from an inability to develop a clear stratigraphic picture of the belts than from ambiguities in interpretation. Four particular stratigraphic problems that afflict studies of Archean greenstone belts are considered: determination of facing directions, correlation of lithologic units, identification of primary lithologies and discrimination of stratigraphic versus structural contacts. B.G.

N86-25904*# Geological Survey of Canada, Ottawa (Ontario).
GREENSTONE BELTS: THEIR BOUNDARIES, SURROUNDING ROCK TERRAINS AND INTERRELATIONSHIPS
J. A. Percival and K. D. Card *In* Lunar and Planetary Inst. Workshop on the Tectonic Evolution of Greenstone Belts 1986 p 15-18 refs (For primary document see N86-25901 16-46)
Avail: NTIS HC A03/MF A01 CSCL 08G

Greenstone belts are an important part of the fragmented record of crustal evolution, representing samples of the magmatic activity that formed much of the Earth's crust. Most belts developed rapidly, in less than 100 Ma, leaving large gaps in the geological record. Surrounding terrains provide information on the context of greenstone belts. The effects of tectonic setting, structural geometry and evolution, associated plutonic activity and sedimentation are discussed. Author

N86-25905*# Rand Afrikaans Univ., Johannesburg (South Africa). Dept. of Geology.
GREENSTONE BELTS: THEIR COMPONENTS AND STRUCTURE
J. R. Vearncombe, J. M Barton, Jr., D. D. vanReenen, G. N. Phillips (Witwatersrand Univ., Johannesburg, South Africa), and A. H. Wilson (Natal Univ., Peitermaritzburg, South Africa) *In* Lunar and Planetary Inst. Workshop on the Tectonic Evolution of Greenstone Belts 1986 p 19-25 refs (For primary document see N86-25901 16-46)
Avail: NTIS HC A03/MF A01 CSCL 08G

Greenstone sucessions are defined as the nongranitoid component of granitoid-greenstone terrain and are linear to irreguiar in shape and where linear are termed belts. The chemical composition of greenstones is described. Also discussed are the continental environments of greenstone successions. The effects of contact with granitoids, geophysical properties, recumbent folds and late formation structures upon greenstones are examined. Large stratigraphy thicknesses are explained. B.G.

N86-25906*# Lunar and Planetary Inst., Houston, Tex.
GREENSTONE BELTS ARE NOT INTRACONTINENTAL RIFTS. WHAT THEN ARE THEY? Abstract Only
Kevin Burke, Celal Sengor, and Maden Fakultesi *In its* Workshop on the Tectonic Evolution of Greenstone Belts 1986 p 27-29 refs (For primary document see N86-25901 16-46)
Avail: NTIS HC A03/MF A01 CSCL 08G

Hundreds of intracontinental rifts with ages between 3.0 and 0 Ga were recognized on Earth. Compressional features are either absent or insignificant in the vast majority of these rifts. Intense compression is the rule in greenstone belts and preservation of regional extensional structures is rare. A common fate of intracontinental rifts is to develop into oceans which are likely to close. Mountain belts mark places where oceans have closed. In contrast to intracontinental rifts both mountain belts and greenstone belts are dominated by compressional structures. It is suggested that greenstone belts are mountain belts marking the places where oceans have closed. The complicated process of ocean closing and the regional complexities recorded in greenstone belts are compared. B.G.

N86-25907*# Saskatchewan Univ., Saskatoon. Dept. of Geological Sciences.
THE WESTERN WABIGOON SUBPROVINCE, SUPERIOR PROVINCE, CANADA: ARCHEAN GREENSTONE SUCCESSION IN RIFTED BASEMENT COMPLEX
G. R. Edwards and D. W. Davis (Royal Ontario Museum, Toronto.) *In* Lunar and Planetary Inst. Workshop on the Tectonic Evolution of Greenstone Belts 1986 p 31-32 refs (For primary document see N86-25901 16-46)
Avail: NTIS HC A03/MF A01 CSCL 08G

The Wabigoon Subprovince, interposed between the predominantly metasedimentary-plutonic and gneissic English River and Quetico Subprovinces to the north and south respectively, exposed Archean greenstone and granitoid rocks for a strike length of greater than 700 km. Based on predominating rock types, the western part of the subprovince is divided into two terrains: the northern Wabigoon volcano-sedimentary and pluonic terrain (NWW) and the Wabigoon Diapiric Axis terrain (WDA). Both the NWW and WDA are described according to volcanic sequence, geological faults, chemical composition and evolutionary history. B.G.

N86-25908*# Geological Survey of Canada, Ottawa (Ontario).
A SIMPLE TECTONIC MODEL FOR CRUSTAL ACCRETION IN THE SLAVE PROVINCE: A 2.7-2.5 Ga GRANITE GREENSTONE TERRANE
P. F. Hoffman *In* Lunar and Planetary Inst. Workshop on the Tectonic Evolution of Greenstone Belts 1986 p 33 refs (For primary document see N86-25901 16-46)
Avail: NTIS HC A03/MF A01 CSCL 08G

A prograding (direction unspecified) trench-arc system is favored as a simple yet comprehensive model for crustal generation in a 250,000 sq km granite-greenstone terrain. The model accounts for the evolutionary sequence of volcanism, sedimentation. deformation, metamorphism and plutonism, observed throughout the Slave province. Both unconformable (trench inner slope) and subconformable (trench outer slope) relations between the volcanics and overlying turbidities; and the existence of relatively minor amounts of pre-greenstone basement (microcontinents) and syn-greenstone plutons (accreted arc roots) are explained. Predictions include: a varaiable gap between greenstone volcanism and trench turbidite sedimentation (accompanied by minor volcanism) and systematic regional variations in age span of volcanism and plutonism. Implications of the model will be illustrated with reference to a 1:1 million scale geological map of the Slave Province (and its bounding 1.0 Ga orogens). B.G.

N86-25909*# Imperial Coll. of Science and Technology, London (England). Dept. of Geology.
GEOLOGICAL EVOLUTION OF THE PIETERSBURG GREENSTONE BELT, SOUTH AFRICA AND ASSOCIATED GOLD MINERALIZATION
M. G. Jones and M. J. deWit (Lunar and Planetary Inst., Houston, Tex.) *In* Lunar and Planetary Inst. Workshop on the Tectonic Evolution of Greenstone Belts 1986 p 35-36 refs (For primary document see N86-25901 16-46)
Avail: NTIS HC A03/MF A01 CSCL 08G

The polyphase history of gold mineralization seen in the Pietersburg greenstone belt is integrated with the geochemical and tectonic evolution of greenstone belts as a whole. The four distinct regional geological settings of gold mineralization are described. B.G.

N86-25910*# Victoria Univ., Wellington (New Zealand). Research School of Earth Sciences.
SYNSEDIMENTARY DEFORMATION AND THRUSTING ON THE EATERN MARGIN OF THE BARBERTON GREENSTONE BELT, SWAZILAND
S. H. Lamb *In* Lunar and Planetary Inst. Workshop on the Tectonic Evolution of Greenstone Belts date p 37-38 refs (For primary document see N86-25901 16-46)
Avail: NTIS HC A03/MF A01 CSCL 08G

Mapping on the eastern margin of the 3.6 to 3.3 Ga Barberton Greenstone Belt NW Swaziland has revealed a tectonic complex which is more than 5 km thick. The area consists of fault bound units made up of three lithological associations. Some of these were affected by four phases of deformation. Fold structures, foliations, and lineations are associated with the deformation. Sedimentation, geological structures, and evolutionary history of the area are explained. B.G.

N86-25911*# National Aeronautics and Space Administration, Washington, D.C.
PRESENT STATE OF KNOWLEDGE OF THE UPPER ATMOSPHERE: AN ASSESSMENT REPORT; PROCESSES THAT CONTROL OZONE AND OTHER CLIMATICALLY IMPORTANT TRACE GASES
R. T. Watson, M. A. Geller (National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.), R. S. Stolarski, and R. F. Hampson May 1986 149 p refs Original

doc. contains color illustrations
(NASA-RP-1162; NAS 1.61:1162) Avail: NTIS HC A07/MF A01 CSCL 04A

The state of knowledge of the upper atmosphere was assessed as of January 1986. The physical, chemical, and radiative processes which control the spatial and temporal distribution of ozone in the atmosphere; the predicted magnitude of ozone perturbations and climate changes for a variety of trace gas scenarios; and the ozone and temperature data used to detect the presence or absence of a long term trend were discussed. This assessment report was written by a small group of NASA scientists, was peer reviewed, and is based primarily on the comprehensive international assessment document entitled Atmospheric Ozone 1985: Assessment of Our Understanding of the Processes Controlling Its Present Distribution and Change, to be published as the World Meteorological Organization Global Ozone Research and Monitoring Project Report No. 16. Author

N86-25912*# Nevada Univ., Reno. Dept. of Geological Sciences.
THE NATURE AND ORIGIN OF MINERAL COATINGS ON VOLCANIC ROCKS OF THE BLACK MOUNTAIN, STONEWALL MOUNTAIN AND KANE SPRINGS WASH VOLCANIC CENTERS IN SOUTHERN NEVADA Semiannual Progress Report, Jul. 1985 - Jan. 1986
James V. Taranik, Donald D. Noble, Liang C. Hsu, and Amy Hutsinpiller Jan. 1986 23 p refs Original contains color illustrations
(Contract NAS5-28765)
(NASA-CR-176805; NAS 1.26:176805) Avail: NTIS HC A02/MF A01 CSCL 08G

Four LANDSAT thematic mapping scenes in southern Nevada were requested at two different acquisition times in order to assess the effect of vegetation on the signature of the volcanic units. The remote sensing data acquisition and analysis portion are nearly completed. The LANDSAT thematic mapping data is of good quality, and image analysis techniques are so far successful in delineating areas with distinct spectral characteristics. Spectrally distinct areas were correlated with variations in surface coating and lithologies of the volcanic rocks. Author

N86-25913*# National Aeronautics and Space Administration, Washington, D.C.
FORMATION OF THE CENTRAL UPLIFT IN METEORIC CRATERS
B. A. Ivanov, A. T. Bazilevskiy, and L. V. Sazonova May 1986 33 p refs Transl. into ENGLISH from Meteoritika, Akademiya nauk SSSR (USSR), no. 40, 1982 p 67-81 Original language document was announced in IAA as A82-47141 Transl. by The Corporate Word, Pittsburgh, Pa.
(Contract NASw-4006)
(NASA-TM-88427; NAS 1.15:88427) Avail: NTIS HC A03/MF A01 CSCL 08G

Data are presented on the sizes of impact craters with central uplifts on the Earth, Moon, and terrestrial planets. It is proposed that the central uplift of the Kara crater in the USSR was formed by impact metamorphism of rocks along a crater having a depth of about 600 meters. A theoretical analysis of the mechanics of hypervelocity impact cratering is used to investigate the features of shock-wave attenuation in the depths of the target and the amount of impact melt formed during this process. An attempt is made to determine the velocity of rock motion during the formation of central uplifts in terrestrial craters. Author

N86-25914# Science Applications International Corp., Arlington, Va.
PLANNING AND CONDUCTING AN INTERNATIONAL SEISMIC DATA EXCHANGE EXPERIMENT AT THE CENTER FOR SEISMIC STUDIES Quarterly Report, 1 Jul. 1984 - 31 Mar. 1985
Carl Romney, Louis Huszar, Gerald A. Frazier, Antoinette Campanella, and Michael A. Tiberio 31 Jan. 1986 308 p refs
(Contract MDA903-84-C-0020)
(AD-A164281; SAIC-86/1025) Avail: NTIS HC A14/MF A01 CSCL 08/11

This report covers preparations for and the conduct of an international seismic data exchange experiment sponsored by the Group of Scientific Experts, U.N. Conference on Disarmament. Seismic data reports from 37 countries were transmitted over circuits of the WMO/GTS. The data were analyzed at centers in Washington, Moscow and Stockholm and epicenter lists were broadcast to participants. The experiment tested a number of aspects of a proposed nuclear test monitoring system. GRA

N86-25915# Physical Dynamics, Inc., Bellvue, Wash.
IMPLEMENTATION OF AN IONOSPHERIC-IMAGE FILE MANAGEMENT, PROCESSING, AND DISPLAY SYSTEM Final Report, 1 Sep. 1981 - 28 Feb. 1985
R. D. Lucas and Robert E. Robins 15 Apr. 1985 38 p refs
(Contract F19628-84-C-0131)
(AD-A164502; PD-NW-85-331R; AFGL-TR-85-0082) Avail: NTIS HC A03/MF A01 CSCL 04/1

This Phase 1 SBIR projet addressed the problem of processing the All-Sky Imaging Photometer (ASIP) images collected in support of ionospheric science programs at AFGL and elsewhere. Hardware and software tools are developed that efficiently transform any image of interest to suitable world coordinates, thus removing the geometric distortions introduced by the ASIP wide-angle lens. Interactive graphical tools are demonstrated for the composite display of multiple, concurrent ASIP images, in geometrically corrected form, with a variety of correlative data from other sensor systems. Such systems might include incoherent-scatter radar, the HILAT satelliite, and others. Eighteen black and white photographs are presented showing examples of actual ASIP images and test patterns in both raw and geometrically corrected form. Results demonstrating the resolution requirements of the ASIP data are included. Various aspects of the geometrical transformation and image-enhancement processing are illustrated, and example composite displays with actual ASIP and HILAT data are presented. Phase 1 focused on determining (1) the resolution, sensitivity, and accuracy required to capture digitally the information present in the ASIP imagery and (2) the size of computational problem involved in the requi red image transformations. It is concluded that a properly integrated workstation involving both analog and digital video and microcomputer-based graphical components will provide a powerful and cost-effective vehicle. GRA

N86-25916# Los Alamos National Lab., N. Mex.
EXPERIMENTAL ASPECTS OF ION ACCELERATION AND TRANSPORT IN THE EARTH'S MAGNETOSPHERE
D. T. Young 1985 57 p refs Presented at the Chapman Conference on Ion Acceleration, Wellesley, Mass., 3 Jun. 1985
(Contract W-7405-eng-36)
(DE86-002409; LA-UR-85-3676; CONF-8506196-2) Avail: NTIS HC A04/MF A01

Major particle population within the Earth's magnetosphere has been studied via ion acceleration processes. Experimental advances over the past ten to fifteen years have demonstrated the complexity of the processes. A review is given here for areas where composition experiments have expanded perception on magnetospheric phenomena. DOE

N86-25917# Environmental Protection Agency, Research Triangle Park, N.C. Atmospheric Sciences Research Lab.
VERTICAL TRANSPORT BY CUMULUS CLOUDS
J. K. S. Ching and A. J. Alkezweeny Dec. 1985 8 p refs Prepared in cooperation with Battelle Pacific Northwest Labs., Richland, Wash.
(PB86-144607; EPA-600/D-85-001) Avail: NTIS HC A02/MF A01 CSCL 04A

The exchange process between the mixed layer and the free troposphere by non precipitating cumulus convective clouds is examined based on results of two field experiments conducted in Lexington, Kentucky. The first experiment used SF6 tracer gas released from one aircraft and sampled by another at various levels in and above the mixed layer as well as on the ground.

The results suggest that the cloud convective activity forces cloud layer air back into the mixed layer and into its surface layer. Thus, the layer of turbulent mixing is deeper and more vigorous in the presence of convective clouds, and the turbulence variance statistics near the surface are apt to contain large, but episodic variability localized within the domain of cloudiness. The observation is shown to be a consequence of and a requirement for a net upward flux of pollutants at the top of the mixer layer. GRA

N86-25918# National Center for Atmospheric Research, Boulder, Colo.
ROLE OF THE OCEANS IN THE ATMOSPHERIC CYCLE OF CARBONYL SULFIDE Ph.D. Thesis
J. E. Johnson 1985 153 p refs Prepared in cooperation with Washington Univ., Seattle
(Grant NSF ATM-82-17015)
(PB86-144078; NCAR/CT-93) Avail: NTIS HC A08/MF A01 CSCL 04A

Carbonyl Sulfide (OCS) is both the dominant sulfur gas in the remote troposphere and, along with volcanoes, a major source of sulfur for the stratospheric sulfate layer. Prior to this work the ocean was regarded as a major sink for atmospheric OCS. The purpose of this study has been to assess the magnitude of the global air-sea flux of OCS. The author designed an analtyical system which was centered around a Varian-3700 gas chromatograph with a flame-photometric detector. To increase the sensitivity of the detector, the hydrogen gas for the flame was doped with sulfur hexafloride. Air samples were concentrated in a liquid nitrogen cooled freeze-out loop, then injected into the gas chromatograph. Water samples purged with sulfur-free zero-air were analyzed similarly. The author also built a permeation tube system for chemical standardization. This euipment was taken on two Pacific Ocean cruises to test air and sea-water concentrations of OCS. GRA

N86-25919# National Geophysical Data Center, Boulder, Colo.
EARTHQUAKE AND TSUNAMI DATA SERVICES AND PUBLICATIONS
Dec. 1985 15 p
(PB86-156254; KGRD-15-Rev) Avail: NTIS HC A02/MF A01 CSCL 08G

The National Environmental Satellite, Data, and Information Service (NESDIS) collects, manages, and diseminates the great mass of information produced by the scientific observation of interplanetary space and the physical world. Data activities in seismology, gravity, geomagnetism, marine geology and geophysics, geothermics, and solar-terrestrial physics are directed by the NESDIA National Geophysical Data Center (NGDC) in Boulder, CO. NGDC also provides facilities for World Data Center-A (including the disciplines of Solid Earth Geophysics, Marine Geology and Geophysics, Solar-Terrestrial Physcis, and Glaciology). The products and services in seismology are briefly described. NGDC is a focal point for disseminating historical earthquake data and information to both technical and general users. Author

N86-25920# National Ocean Service, Anchorage, Alaska. Ocean Assessments Div.
OUTER CONTINENTAL SHELF ENVIRONMENTAL ASSESSMENT PROGRAM. FINAL REPORTS OF PRINCIPAL INVESTIGATORS, VOLUME 34
Aug. 1985 426 p Sponsored by Minerals Management Service
(PB86-150109) Avail: NTIS HC A19/MF A01 CSCL 08G

A compilation is given of three final reports dealing with geologic processes and hazards of the Beaufort and Chukchi Sea Shell and coastal regions: Beaufort and Chukchi, seacoast permafrost studies; and the environmental geology and geomorphology of the Barrier Island-lagoon system along the Beaufort Sea coastal plain from Prudhoe Bay to the Colville River. Fifteen oversized maps are included. Author

N86-25921# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
STATISTICAL MODEL TO ESTIMATE THE REFRACTIVITY TURBULENCE STRUCTURE CONSTANT CARBON SUP 2 SUB n IN THE FREE ATMOSPHERE
J. M. Warnock and T. E. VanZandt Nov. 1985 181 p
(PB86-148749; NOAA-TM-ERL-AL-10) Avail: NTIS HC A09/MF A01 CSCL 04A

The report describes a statistical model that estimates mean values of the refractivity turbulence structure constant (C sub n, sup2) in the stable free atmosphere from standard National Weather Service balloon data or an equivalent data set. A computer program that evaluates the model is also described and listed. The model is based on a statistical turbulent model developed by VanZandt, Gage, and Warnock to interpret VHF Doppler radar echoes. Height profiles of the model (C sub n, sup 2) agree well with measured profiles with a height resolution of about 1km. The program also estimates the mean values of the turbulent energy dissipation rate epsilon but, because of the lack of observations, the computed values of epsilon have not been evaluated sufficiently to be used in routine applications. GRA

N86-25922*# National Geophysical Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA NUMBER 496, DECEMBER 1985. PART 1: (PROMPT REPORTS). DATA FOR NOVEMBER 1985, OCTOBER 1985 AND LATE DATA
H. E. Coffey, ed. May 1985 105 p
(NASA Order W-15519; Grant NSF ATM-83-18491)
(NASA-CR-176795; NAS 1.26:176795; PB86-156866;
SGD-496-Pt-1) Avail: NTIS HC A06/MF A01 CSCL 03B

Data for November 1985 on IUWDS alert period; solar activity indices, solar flares, solar radio emission, VOSTOK inferred interplanetary magnetic field polarity, Stanford mean solar magnetic field, sudden ionospheric disturbances, cosmic ray measurements, geomagnetic indices, solar radio spectral observations, and calcium plage are presented. B.G.

N86-25923*# National Geophysical Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA NUMBER 496, DECEMBER 1985. PART 2: (COMPREHENSIVE REPORTS). DATA FOR JUNE 1985, JANUARY-MAY 1985 AND MISCELLANEA
H. E. Coffey, ed. Dec. 1985 68 p
(NASA Order W-15519; Grant NSF ATM-83-18491)
(NASA-CR-176793; NAS 1.26:176793; PB86-156874;
SGD-496-Pt-2) Avail: NTIS HC A04/MF A01 CSCL 03B

Contents include the detailed index for 1985; data for June 1985 (solar flares, solar radio bursts at fixed frequencies, solar X-ray radiation from GOES satellite graphs, mass ejections from the sun, and active prominences and filaments); data for January to May 1985 (solar flares January 1985, solar flares February 1985, solar flares March 1985, solar flares April 1985, solar flares May 1985, and number of flares August 1966 to June 1985); and the international geophysical calendar 1986. Author

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N86-25924*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DESCRIPTION OF DATA ON THE NIMBUS 7 LIMS MAP ARCHIVE TAPE: TEMPERATURE AND GEOPOTENTIAL HEIGHT
Kenneth V. Haggard, Ellis E. Remsberg, William L. Grose, James M. Russell, III, B. T. Marshall (SASC Technologies, Inc., Hampton, Va.), and G. Lingenfelser (Analytical Mechanics Associates, Inc., Hampton, Va.) May 1986 55 p refs
(NASA-TP-2553; L-16071; NAS 1.60:2553) Avail: NTIS HC A04/MF A01 CSCL 04B

The process by which the analysis of the Limb Infared Monitor of the Stratosphere (LIMS) experiment data were used to produce estimates of synoptic maps of temperature and geopotential height is described. In addition to a detailed description of the analysis procedure, several interesting features in the data are discussed

and these features are used to demonstrate how the analysis procedure produced the final maps and how one can estimate the uncertainties in the maps. In addition, features in the analysis are noted that would influence how one might use, or interpret, the results. These include subjects such as smoothing and the interpretation of wave components. While some suggestions are made for an improved analysis of the data, it is shown that, in general, the maps are an excellent estimation of the synoptic fields. Author

N86-25925# Lawrence Livermore National Lab., Calif.
STUDIES OF COMPLEX TERRAIN WIND FLOWS USING ACOUSTIC SOUNDER AND OPTICAL CROSS-WIND REMOTE SENSORS
W. M. Porch, W. Neff, and C. King Aug. 1985 26 p refs
(Contract W-7405-eng-48)
(DE86-002993; UCID-20519; ASCOT-85-2) Avail: NTIS HC A03/MF A01

Remote sensing instrumentation has played an important role in the Atmospheric Studies in Complex Terrain (ASCOT) field experimental program. The goal of this program is to better understand transport and diffusion processes in complex terrain with an emphasis focused on nighttime drainage wind conditions. Two aspects of the instrumentation are discussed: acoustic sounders (Doppler and monostatic) and space averaging optical crosswind sensors. Data from these two sources are discussed and compared with data from conventional tower and tethersonde instrumentation. DOE

N86-25926# Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
GENERAL CIRCULATION VARIABILITY, MEDIUM TO LONG-RANGE FORECASTING AND ENERGY INDUSTRY RELATED APPLICATIONS Final Report, 1 Jan. 1983 - 31 Dec. 1985
E. R. Reiter Dec. 1985 14 p
(Contract DE-AC02-76EV-01340)
(DE86-004819; DOE/EV-01340/17) Avail: NTIS HC A02/MF A01

Progress is reported on: establishment of a data base of Sea Surface Temperatures (SST) in North Atlantic and North Pacific and of atmospheric data at constant pressure levels; diagnostic planetary wave patterns on prolonged weather and/or short-term climate anomalies; numerical modeling experiments, involving the application of a simple General Circulation Model (GCM) to an assessment of climate-controlling teleconnections; long-range forecasting tests, involving teleconnections between surface anomalies and planetary wave pattern anomalies; forecast risk assessments, estimating the confidence level to be placed on a long-range forecast; energy-industry related forecasting applications, such as estimates of electric power demands; and user-friendly forecast output design which would allow easy dissemination of forecast products. DOE

N86-25927*# Massachusetts Inst. of Tech., Cambridge. Hydrology and Water Resource Systems.
SPATIAL CHARACTERISTICS OF OBSERVED PRECIPITATION FIELDS: A CATALOG OF SUMMER STORMS IN ARIZONA, VOLUME 1
Neil M. Fennessey, Peter S. Eagleson, Wang Qinliang, and Ignacio Rodrigues-Iturbe Mar. 1986 420 p 2 Vol.
(Grants NAG5-388; NSF ATM-84-20781)
(NASA-CR-176824; NAS 1.26:176824; MIT-R-86-03-Vol-1; MIT-307-Vol-1) Avail: NTIS HC A18/MF A01 CSCL 04B

Eight years of summer raingage observations are analyzed for a dense, 93 gage, network operated by the U. S. Department of Agriculture, Agricultural Research Service, in their 150 sq km Walnut Gulch catchment near Tucson, Arizona. Storms are defined by the total depths collected at each raingage during the noon to noon period for which there was depth recorded at any of the gages. For each of the resulting 428 storms, the 93 gage depths are interpolated onto a dense grid and the resulting random field is anlyzed. Presented are: storm depth isohyets at 2 mm contour intervals, first three moments of point storm depth, spatial correlation function, spatial variance function, and the spatial distribution of total rainstorm depth. Author

N86-25928*# Massachusetts Inst. of Tech., Cambridge. Hydrology and Water Resource Systems.
SPATIAL CHARACTERISTICS OF OBSERVED PRECIPITATION FIELDS: A CATALOG OF SUMMER STORMS IN ARIZONA, VOLUME 2
Neil M. Fennessey, Peter S. Eagleson, Wang Qinliang, and Ignacio Rodriguez-Iturbe Mar. 1986 569 p 2 Vol.
(Grants NAG5-388; NSF ATM-84-20781)
(NASA-CR-176823; NAS 1.26:176823; MIT-R-86-03-Vol-2; MIT-307-Vol-2) Avail: NTIS HC A24/MF A01 CSCL 04B

The parameters of the conceptual model are evaluated from the analysis of eight years of summer rainstorm data from the dense raingage network in the Walnut Gulch catchment near Tucson, Arizona. The occurrence of measurable rain at any one of the 93 gages during a noon to noon day defined a storm. The total rainfall at each of the gages during a storm day constituted the data set for a single storm. The data are interpolated onto a fine grid and analyzed to obtain: an isohyetal plot at 2 mm intervals, the first three moments of point storm depth, the spatial correlation function, the spatial variance function, and the spatial distribution of the total storm depth. The description of the data analysis and the computer programs necessary to read the associated data tapes are presented. B.G.

N86-25929# Range Commanders Council, White Sands Missile Range, N. Mex. Inter-Range Inst. Group.
IRIG STANDARDS FOR RANGE METEOROLOGICAL DATA REDUCTION. PART 2. ROCKETSONDE
Dec. 1985 385 p
(AD-A163634; IRIG-Standard-352-85-Pt-2) Avail: NTIS HC A17/MF A01 CSCL 04/1

The Rocket Reduction Program is designed to process data acquired by standard Loki and Super Loki rocketsondes. This program accepts input data taken from the AN/TMQ-5 record and the strip chart from the MSS Tracking System, a radar and/or AN/GMD-4 Rawin Set, plus co-rawinsonde baseline data. The program processes input data and output as its final product rocketsonde data in readily usable tabular format; card decks, if desired; and rocketsonde message code (ROCOB). The MSS rocketsonde reduction procedure is designed for use with transponder sondes only, such as the PWN-10A. It consists of two programs, Pass 1 and Pass 2. This document is divided into two self-contained sections. Pass 1 of the MSS rocketsonde reduction procedure reduces the wind and temperature data recorded by the MSS realtime program. Output options and surface data are entered by the operator from the display console. This pass produces quality control data, constant altitude data, and two disk files. Pass 2 of the MSS rocketsonde reduction procedure extracts the HAMDATA levels from the intermediate scratch file and the co-rawinsonde file. This pass uses the 1,000-meter constant altitude file and the intermediate scratch file to produce the ROCOB coded message. GRA

N86-25930# Maryland Univ., College Park. Dept. of Meteorology.
RADIATION CLIMATE AND TURBULENCE STRUCTURE OF A TROPICAL DRY EVERGREEN FOREST Final Report, 25 Oct. 1979 - 15 Jun. 1985
R. T. Pinker Nov. 1985 132 p refs
(Contract DAAG29-80-C-0012)
(AD-A164079; SR-85-29; ARO-16755.9-GS) Avail: NTIS HC A07/MF A01 CSCL 04/2

The research under this grant was based on information collected during the TREND (Tropical Environmental Data) experiment conducted during 1967-70 in a tropical forest environment in Southeast Asia. Under this grant, we completed the data reduction process and conducted numerous scientific investigations which dealt with such topics as: radiation climate of the tropical forest; radiative transfer in vegetative canopies; seasonal variation in the radiation balance at canopy/air, ground/air interface;

seasonal turbidity characteristics over the tropical forest; the temporal variation and stability dependence of the turbulence structure above and below the canopy; wind direction shear in the dense, semi-flexible tall vegetation; and variability parameters within and above the canopy, which characterize the dispersion process under different stability and ambient wind conditions. In this report only selected results will be presented. A detailed list of references to publications resulting from this project can be found in Appendix A. Information about the final data products resulting from this project can be found in Appendix B.
Author (GRA)

N86-25931# Air Force Geophysics Lab., Hanscom AFB, Mass.
MODEL VERTICAL PROFILES OF EXTREME RAINFALL RATE, LIQUID WATER CONTENT AND DROP-SIZE DISTRIBUTION Final Technical Report, 1984 - 1985
Paul Tattelman and Paul T. Willis 6 Sep. 1985 43 p refs
(AD-A164424; AFGL-TR-85-0200; AFGL-ERP-928) Avail: NTIS HC A03/MF A01 CSCL 04/2

This report provides a new model of hydrometeors and associated cloud-water content from the surface to 20 km. The model profiles at altitude were developed based on five surface rainfall rates: 36, 84, 168, 432, and 1872 mm/hr. The first three rates correspond to a frequency of occurrence of 0.5 percent, 0.1 percent, and 0.01 percent of the time during the worst month in the most severe area of the world for intense rainfall. The last two are the 42- and 1-min world record rainfalls. The surface rainfall rates were extrapolated aloft using results from previous studies. A large sample of drop-size distributions from intense rainfall collected during reconnaisance of Atlantic hurricanes/ tropical storms was analyzed. The data set was normalized and fit by a gamma distribution. This was used to specify the drop-size distributions and liquid water content for rainfall rates specifies at the surface and aloft. Concurrent cloud-water content was estimated. Results are presented at 2-km intervals. Author (GRA)

N86-25932# Naval Postgraduate School, Monterey, Calif.
GEOSTATIONARY SATELLITE ANALYSES OF PRECIPITATION AND CLOUD PARAMETERS M.S. Thesis
Laura A. Spray Dec. 1985 101 p refs
(AD-A164441) Avail: NTIS HC A06/MF A01 CSCL 04/2

Satellite and surface data are used to analyze mesoscale and subsynoptic cloud and precipitation patterns. Digital GOES (Geostationary Operational Environment Satellite) visible and infrared data are used to produce high resolution (4 n mi) satellite analyses of cloud amount, cloud type, cloud-top temperature and height, and precipitation intensity for an approximate 1600 x 1600 n mi area over the northeastern United States and the western North Atlantic Ocean. Conventional surface observations, the Automated Radar Summary chart and manual analysis of the imagery are used to evaluate the satellite-derived analyses for nine cases during the winger and spring 1985. The majority of cloud amount estimates for clear and overcast sky conditions are analyzed correctly; however, broken and scattered skies are underestimated. The general cloud type patterns are depicted accurately. More success occurs with uniform-textured clouds (i.e., nimbostratus, stratocumulus) and multi-layered clouds than with nonuniform-textured clouds (i.e., cirrus, cumulus). The majority of cloud-top temperature/height analyses are representative of the cloud types and patterns. Most atmospheric precipitation areas are identified correctly; however, the intensity of the precipitation is underestimated. GRA

N86-25933# National Bureau of Standards, Gaithersburg, Md.
A THREE-DIMENSIONAL MESOSCALE MODEL FOR THE SIMULATION OF CLOUDS, PRECIPITATION AND AIRFLOW Final Report, 1 Oct. 1983 - 31 Sep. 1985
Everett C. Nickerson 31 Oct. 1985 136 p refs
(AF Proj. 6670)
(AD-A164468; AFGL-TR-85-0307) Avail: NTIS HC A07/MF A01 CSCL 04/2

A simulation of a heavy rainfall event has been carried out over southern France using 2-D Neph data to initialize a meso-alpha model. That model was subsequently run for a period of three hours and the resulting meteorological fields were then interpolated to a smaller grid to provide balanced initial conditions for a meso-beta model with parameterized microphysics. The meso-beta model is shown to be capable of simulating many features of an orographically forced precipitation event, including the temporal and spatial evolution of liquid water, as well as the number concentration (and hence size distribution) of raindrops. The model is especially suited for the simulation of clouds, precipitation, and airflow over complex terrain. GRA

N86-25934# Naval Postgraduate School, Monterey, Calif.
INVESTIGATION OF HIGH AND LOW PREDICTABILITY PERIODS IN MEDIUM RANGE FORECASTS M.S. Thesis
John E. Curtis Dec. 1985 75 p refs
(AD-A164495) Avail: NTIS HC A04/MF A01 CSCL 04/2

Medium-range five-day forecasts from the U.S. Navy Operational Global Atmospheric Prediction System (NOGAPS) are investigated to study high and low predictability periods from two winter seasons. Northern hemisphere 500 mb height fields are scored using the anomaly correlation coefficient. An objective method is used to choose high and low scoring periods which are analyzed using height tendencies and wavenumber structure. Results show that it is possible to objectively determine why some high and low periods occurred. Flow characteristics leading to high scoring five-day forecasts include: long wave amplitude decay, transition from meridional to zonal flow, and more meridionally extensive flow patterns. This study revealed that persistence is not a good indicator of model performance, and no appreciable skill difference exists between good and poor five-day forecasts at the 48 hour point. However, no single measure of the flow patterns is found to be a unique indicator of high or low scoring forecasts. Author (GRA)

N86-25935# Washington Univ., St. Louis, Mo.
CLIMATIC TRENDS OVER NORTH AMERICA: POTENTIAL ROLE OF AEROSOLS
R. B. Husar and W. E. Wilson Nov. 1985 21 p refs Sponsored in part by EPA
(PB86-129533; EPA-600/D-85-282) Avail: NTIS HC A02/MF A01 CSCL 04B

The spatial pattern and the trends (1948 to 1980) of several key climatic parameters show that there has been a reduction of the surface noon temperature, over the S.E. United States. During the same time, and over the same region, there was increase of dewpoint, relative humidity, and noon cloud cover. The region over which these changes occurred coincides with the region of most significant increase in haziness (aerosol concentration). However, a cause-effect relationship is not established. GRA

N86-25936# National Oceanic and Atmospheric Administration, Rockville, Md. Fed. Coord. for Meteorol. Svcs./Supporting Res.
NATIONAL HURRICANE OPERATIONS PLAN, MAY 1985
May 1985 84 p
(PB86-148384; FCM-P12-1985) Avail: NTIS HC A05/MF A01 CSCL 04B

The Tropical Cyclone Warning Service is an interdepartmental effort to provide the United States and designated international recipients with forecasts, warnings, and assessments concerning tropical and subtropical weather systems. The National Oceanic and Atmospheric Administration (NOAA) is responsible for providing forecasts and warnings for the Atlantic, and Eastern and Central Pacific Oceans, while the Department of Defense (DOD) provides the same for the West Pacific and Indian Oceans. The procedures and agreements contained herein apply to the Atlantic, Gulf of Mexico, Caribbean, and North Pacific east of the 180th meridian. The plan is intended to define the role of the individual agencies participating in the hurricane warning service when more than one agency is involved in the delivery of service in any specific area. GRA

N86-25937# National Weather Service, Silver Spring, Md. Techniques Development Lab.

AFOS (AUTOMATION OF FIELD OPERATIONS AND SERVICES) - ERA FORECAST VERIFICATION, OCTOBER 1985
D. P. Ruth, R. L. Miller, and M. M. Heffernan Oct. 1985 60 p
(PB86-148319; NOAA-NWS-TDL-CP-85-3) Avail: NTIS HC A04/MF A01 CSCL 04B

The National Weather Service (NWS) has implemented a national forecast verification system which utilizes the processing and communication capabilities of the Automation of Field Operations and Services (AFOS) system. The AFOS-era forecast verification (AEV) system is a major step in implementing the National Verification Plan (NWS, 1982a) and replaces two existing national verification programs. The software described here creates and maintains the local data base of collated forecasts and observations. It also transmits the locally collected forecasts and observations to NMC. The design of the local, long term archive and the production of local summaries can be adjusted to suit local needs. GRA

N86-25938# National Severe Storms Forecast Center, Kansas City, Mo.
SEVERE LOCAL STORM WARNING VERIFICATION: 1984
P. W. Leftwich and L. A. Grenier Dec. 1985 22 p refs
(PB86-148244; NOAA-TM-NWS-NSSFC-10) Avail: NTIS HC A02/MF A01 CSCL 04B

Tornado and severe thunderstorm warnings are issued by the local office of the National Weather Service. Routine verification of these warnings is accomplished at the National Severe Storms Forecast Center. Verification procedures and summarized national, regional, and local verification results for the years 1984 are highlighted. Stations in the Central and Southern regions issued most of the warnings and experienced most of the severe local storm events. GRA

N86-25939# National Oceanic and Atmospheric Administration, Seattle, Wash. Marine Environmental Lab.
SEA ICE DYNAMICS AND REGIONAL METEOROLOGY FOR THE ARCTIC POLYNYA EXPERIMENT (APEX)-BERING SEA 1985
C. H. Pease, M. Reynolds, G. A. Galasso, V. L. Long, and S. A. Salo Oct. 1985 129 p
(PB86-148038; NOAA-TM-ERL-PMEL-64) Avail: NTIS HC A07/MF A01 CSCL 04B

The purpose of the Artic Polynya Experiment (APEX) is to investigate physical processes and thermodynamics in the atmosphere, sea ice, and ocean in the vicinity of St. Lawrence Island in the northern Bering Sea. The relative importance on sea ice motion of baroclinic currents due to brine rejection during the freezing of ice in the polynya, barotropic currents due to set-up on the shelf, internal ice stress due to the presence of St. Lawrence Island, wind stress and Coriolis force are being considered through a measurement and modeling program. GRA

N86-25940# National Weather Service, Kansas City, Mo.
STATISTICAL ANALYSIS OF SHEF (STANDARD HYDROMETEOROLOGICAL EXCHANGE FORMAT) CODING ERRORS
R. S. Cox Jan. 1986 51 p refs
(PB86-145141; NOAA-TM-NWS-CR-78) Avail: NTIS HC A04/MF A01 CSCL 04B

The Standard Hydrometeorological Exchange Format (SHEF) is used throughout the Centrl Region to facilitate the automatic communication and processing of hydrometeorlogical data essential to the automation of procedures which utilize the data. Software developed to statistically analyze the coding error in SHEF messages encountered during parsing and posting are described. GRA

N86-25941# National Weather Service, Kansas City, Mo.
CLIMATOLOGICAL SUMMARY PROGRAMS F6, CLIMATE, SUMMARY, GETCS
1. F. Schwein Dec. 1985 92 p
(PB86-143948; NOAA-NWS-CRCP-14-Rev) Avail: NTIS HC A05/MF A01 CSCL 04B

The Climatological Summary Programs F6, Climate, Summary, and GETCS are programs that process daily climatological data and prepare monthly summaries of the data. These programs are described. GRA

N86-25942# National Weather Service, Garden City, N.Y.
COMPARISON AMONG VARIOUS THERMODYNAMIC PARAMETERS FOR THE PREDICTION OF CONVECTIVE ACTIVITY, PART 2
H. M. Stone Dec. 1985 22 p refs
(PB86-142353; NOAA-TM-NWS-ER-69) Avail: NTIS HC A02/MF A01 CSCL 04B

A multitude of stability indices and thermodynamic parameters is now available for use in forecasting convection and severe weather. The performance of the more commonly used stability indices is well known, but the behavior of some of the more recently developed parameters has not previously been tested. A statistical comparison of the effectiveness of several of these parameters for forecasting various types of convection will be presented in the report. GRA

N86-25943# National Weather Service, Washington, D.C. Climate Analysis Center.
MONTHLY AND SEASONAL WEATHER OUTLOOK FOR MID-FEBRUARY TO MID-MARCH 1986, VOLUME 40, NUMBER 4, FEBRUARY 14, 1986
14 Feb. 1986 10 p
(PB86-162229) Avail: NTIS HC A02/MF A01 CSCL 04B

The report gives temperature and precipitation probabilities for the monthly and seasonal weather for North America. GRA

N86-25944# National Weather Service, Honolulu, Hawaii.
TROPICAL CYCLONES, 1983, CENTRAL NORTH PACIFIC
W. Au, A. Chun, A. Inouye, H. Rosendal, and T. Yamashiroya Dec. 1985 41 p
(PB86-158185; NOAA-TM-NWSTM-PR-29) Avail: NTIS HC A03/MF A01 CSCL 04B

The report describes and classifies tropical storms in the Central region of the North Pacific Ocean for 1983. GRA

N86-25945# National Oceanic and Atmospheric Administration, Miami, Fla. Oceanographic and Meteorological Labs.
HURRICANE RESEARCH DIVISION, ATLANTIC OCEANOGRAPHIC AND METEOROLOGICAL LABORATORY FISCAL YEAR 1985 PROGRAMS: FISCAL YEAR 1986 PROJECTIONS
Jan. 1986 52 p refs
(PB86-158755) Avail: NTIS HC A04/MF A01 CSCL 04B

The Hurricane Research Division (HRD) is NOAA's primary focus for research on hurricanes and tropical meteorology. HRD's research is directed at improved hurricane prediction through improved physical understanding of the structure and dynamics of these storms. Intensive studies of Hurricane Danny were carried out on August 14 and 15. Long-term monitoring aircraft patterns provide data to study the manner in which the hurricane's central core blends into its environment. Collected in Hurricane Elena, from August 28 through September 2, were exceptionally large quantities of valuable data for use in long-term monitoring (hurricane environmental interaction) and vortex evolution studies. GRA

N86-25946# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
FEASIBILITY STUDY ON THE USE OF FIREFINDER RADAR FOR WIND PROFILING
R. G. Strauch, A. S. Frisch, R. A. Kropfli, and B. L. Weber Dec. 1985 67 p refs
(PB86-158417; NOAA-TM-ERL-WPL-128) Avail: NTIS HC A04/MF A01 CSCL 04B

Firefinder, a microwave battlefield radar used for weapon location, can provide wind information for artillery control in some meteorological conditions. Theoretical considerations and experimental evidence indicates that Firefinder could produce wind measurements at low altitudes in the optically clear atmosphere, in precipitation, and in many clouds, but the radar wavelength is too short for routine wind measurements in the optically clear atmosphere above the boundary layer. GRA

N86-25947# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Labs.
PROGRAM FOR REGIONAL OBSERVING AND FORECASTING SERVICES (PROFS), FISCAL YEAR 1985 Annual Report, 1 Oct. 1984 - 30 Sep. 1985
Jan. 1985 33 p refs
(PB86-158110) Avail: NTIS HC A03/MF A01 CSCL 04B

NOAA's Program for Regional Observing and Forecasting Services annual report for fisical '85 contains the following: organizational charts; budget and funding; personnel statistics; exploratory development facility; exploratory development group; analysis and prediction; experimental forecast systems; system design and implementation; and test and evaluation. GRA

N86-25948# National Weather Service, Fort Worth, Tex.
MINIMUM TEMPERATURE FORECAST AID FOR RADIATIONAL COOLING SITUATIONS IN THE LOWER RIO GRANDE VALLEY OF TEXAS
T. M. Hicks Jan. 1986 13 p refs
(PB86-154242; NOAA-TM-NWS-SR-115) Avail: NTIS HC A02/MF A01 CSCL 04B

The Lower Rio Grande Valley of Texas is known for its relatively mild winters. But nonetheless, the area is subject to freezes that can severly damage the citrus, winter vegetable, and sugar cane crops. Freezes in the valley may be classified and advection freezes or radiation freezes-or occasionally a combination of the two. Both are associated with outbreaks of arctic air. However, advection freezes are associated with wind (often strong) and perhaps clouds, while radiation freezes are characterized by clear skies and light or calm wind. The paper offers a forecast equation that is directed toward the radiation type of freeze and other non-freezing radiational cooling situations that affect the valley each year. GRA

N86-25949# National Weather Service, Washington, D.C. Climate Analysis Center.
MONTHLY AND SEASONAL WEATHER OUTLOOK FOR FEBRUARY 1986, VOLUME 40, NUMBER 3, JANUARY 30, 1986
30 Jan. 1986 10 p
(PB86-155660) Avail: NTIS HC A02/MF A01 CSCL 04B

Temperature and precipitation probabilities for the Northern Hemisphere on a periodic and seasonal basis are presented. GRA

N86-25950# National Weather Service, Silver Spring, Md. Techniques Development Lab.
AFOS (AUTOMATION OF FIELD OPERATIONS AND SERVICES) ERA FORECAST VERIFICATION
D. P. Ruth, R. L. Miller, and M. M. Heffernan Oct. 1985 52 p
(PB86-152386; NOAA-NWS-TDL-CP-85-3) Avail: NTIS HC A04/MF A01 CSCL 04B

The National Weather Service (NWS) has implemented a national forecast verification system which utilizes the processing and communication capabilities of the automation of field operations and services (AFOS) system. The AFOS-era forecast vertification (AEV) system is a major step in implementing the national verification plan (NWS, 1982a) and replaces two existing national verification programs. The software described in the report, which is implemented at Weather Service Forecast Office, creates and maintains the local database of collated forecasts and observations. It also transmits the locally collected forecasts and observations to NMC. The design of the local, long-term archive and the production of local summaries can be adjusted to suit local needs. GRA

N86-25951# National Weather Service, Silver Spring, Md. Techniques Development Lab.
AFOS (AUTOMATION OF FIELD OPERATIONS AND SERVICES) TERMINAL FORECAST DECODING
D. J. Vercelli, G. A. Norman, and M. M. Heffernan Oct. 1985 19 p
(PB86-152337; NOAA-NWS-TDL-CP-85-2) Avail: NTIS HC A02/MF A01 CSCL 04B

Terminal forecasts (FT's) are issued by Weather Service Forecast Offices (WSFO's) for approximately 500 airports nationwide. These forecasts are issued both on a scheduled and non-scheduled basis to serve the pre-flight and in-flight meteorological service requirements of domestic aviation operations by providing definitive weather information about cloud heights and amounts, visibility, weather, obstructions to visibility, and wind. This paper describes two FORmula TRANslation (FORTRAN) subroutine programs which together with their subordinate subroutines can be used to decode FT's. GRA

N86-25952# Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.
CITPUFF: A GAUSSIAN PUFF MODEL FOR ESTIMATING POLLUTANT CONCENTRATION IN COMPLEX TERRAIN
D. G. Ross, D. G. Fox, D. L. Dietrich, J. E. Childs, and W. E. Marlatt Jul. 1985 30 p
(PB86-150885; FSRP-RM-261) Avail: NTIS HC A03/MF A01 CSCL 04B

CITPUFF, is a puff-type dispersion model that uses a wind field calculated from a complex-terrain wind model. It accommodates a variety of source types including point, area, and line sources; calculates plume rise where applicable; and outputs a graphic display of puff trajectories and concentrations. The model is compared against models currently used for assessing air quality impacts in complex topography. GRA

N86-25953# National Oceanic and Atmospheric Administration, Miami, Fla. Atlantic Oceanographic and Meteorological Labs.
ATLANTIC OCEANOGRAPHIC AND METEOROLOGICAL LABORATORY FISCAL YEAR 1985 REPORT Annual Report
Jan. 1986 69 p
(PB86-150091) Avail: NTIS HC A04/MF A01 CSCL 04B

Presented are the major accomplishments and plans of NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML) for fiscal years 1985-86. The mission of NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML) is to conduct a basic and applied research program in oceanography and tropical meteorology. The program seeks to understand the physical characteristics and processes of the ocean and the atmosphere, both separately and as a coupled system. Oceanographic investigations center on the fluxes of energy, momentum, and materials through the air-sea interface; the transport and composition (thermal and chemical) of water in the ocean volume; and hydrothermal processes of mineralization at seafloor spreading centers. Meteorological research is carried out to improve the description, understanding, and prediction of hurricanes. The principal focus of these investigations is to provide the knowledge that will ultimately lead to improved prediction and forecasting of severe storms. GRA

N86-25954# National Weather Service, Silver Spring, Md. Techniques Development Lab.
AFOS (AUTOMATION OF FIELD OPERATIONS AND SERVICES) TERMINAL FORECAST DECODING
D. J. Vercelli, G. A. Norman, and M. M. Heffernan Oct. 1985 23 p
(PB86-147360; NOAA-NWS-TDL-CP-85-2) Avail: NTIS HC A02/MF A01 CSCL 04B

Terminal forecasts (FT's) are issued by Weather Service Forecast Offices (WSFO's) for approximately 500 airports nationwide. A regularly scheduled FT is valid for the 24-h period following its issuance. The FT's are prepared manually each day at WSFO's which have FT responsibilities. Once prepared, they are then stored in the local Automation of Field Operations and Services (AFOS) database and transmitted over the AFSO communications circuits. The information in the forecasts can also be used by various applications programs at the local office (e.g., Vercelli and Norman, 1985). To do this, however, the forecasts must first be decoded. The paper describes two formula translation (FORTRAN) subroutine programs which together with their subordinate subroutines can be used to decode FT's. GRA

N86-25955# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.

OPTICAL SYSTEM MODEL 4 FOR SPACE-AVERAGED WIND AND C SUB n SUP 2 MEASUREMENTS
G. R. Ochs and W. D. Cartwright Oct. 1985 51 p
(PB86-144086; NOAA-TM-ERL-WPL-52-Rev) Avail: NTIS HC A04/MF A01 CSCL 04B

An optical instrument that measures the path averaged values of the refractive index structure parameter (C sub n, sup 2) and the crosswind over optical paths from 200 to 1500 m. On optimum path lengths of 900 to 1200 m, (C sub n, sup 2) can be measured over a range from 1 x 10 to the 12th power to 1 x 10 to the 16th power (m exp-2/3). Author

N86-25956*# Chicago Univ., Ill. Satellite and Mesometeorology Research Project.
DFW (DALLAS-FT. WORTH) MICROBURST ON AUGUST 2, 1985
T. T. Fujita 1986 162 p
(Grant NGR-14-001-008; Contract NA85AA-DR-064; Grant NSF ATM-81-09828)
(NASA-CR-176794; NAS 1.26:176794; PB86-131638; SMRP-RP-217; LC-85-52386) Avail: NTIS HC A08/MF A01 CSCL 04B

The features of the microburst on August 2, 1985, related to the Delta 191 accident during the approach to Runway 17L of the Dallas-Ft. Worth Airport is described. Both radar and satellite data, along with ground-based measurements, were used in determining the characteristics of the parent cloud which spawned the most complicated microburst winds ever analyzed by the author. The detailed reconstruction of the airflow and the aircraft's maneuver were made possible by a series of computer analyses of the Digital Flight Data Recorder (DFDR) readout. Both measured and computed values in color diagrams that can be evaluated readily by meteorologists, pilots, structural engineers, and other interested persons in preventing microburst-related accidents in future years are presented. Author

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N86-25957# Skidaway Inst. of Oceanography, Savannah, Ga.
TRACE ELEMENT GEOCHEMISTRY OF THE SOUTH ATLANTIC BIGHT Progress Report
H. L. Windom Dec. 1985 35 p
(Contract DE-AS09-76EV-00890)
(DE86-004004; DOE/EV-00890/T8) Avail: NTIS HC A03/MF A01

Sediment samples collected from over fifty cores from phase 1 have been analyzed for trace metals, carbon and nitrogen and these data have been used to identify dominant phases in which trace elements reside in the sediments. Over half of the box cores collected were also analyzed for excess (210)Pb to determine sedimentation rates which range from 0.44 to 1.44 cm . yr(-1). Particulate samples collected during the Spring Shelf Removal Experiment (SPREX) have been analyzed for trace metals, carbon and nitrogen. DOE

N86-25958# Skidaway Inst. of Oceanography, Savannah, Ga.
TRACE ELEMENT GEOCHEMISTRY OF THE SOUTH ATLANTIC BIGHT Progress Report
H. L. Windom Dec. 1985 48 p refs
(Contract DE-AS09-76EV-00890)
(DE86-004921; DOE/EV-00890/9) Avail: NTIS HC A03/MF A01

This report summarizes work accomplished since 1 December 1984. Studies of nearshore sediment geochemistry have involved the collection of over 100 box cores within the coastal boundary zone. All of the cores have been X-radiographed and peeled to determine stratigraphy and trace element analyses completed. During the past year we participated in SPREX (Spring Removal Experiment) and collected over 100 suspended sediment samples along transects perpendicular to shore in a region where coastal waters are hypothesized to be more efficiently transported across the shelf during the spring. DOE

N86-25959*# National Aeronautics and Space Administration, Washington, D.C.
MONOGRAPH ON PROSPECTIVE DEVELOPMENTS IN OCEANOLOGY
A. S. Monin Jun. 1986 9 p Transl. into ENGLISH from NTA Problemi i Resheniya (USSR), no. 5, Mar. 1986 p 8 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-4004)
(NASA-TM-87983; NAS 1.15:87983) Avail: NTIS HC A02/MF A01 CSCL 08C

Excerpts from a chapter of a monograph, Oceanology in the Year 2000, which has been prepared for publication at the USSR Academy of Sciences' Institute of Oceanology, is presented. The author of this chapter is A. S. Morin, corresponding member of the USSR Academy of Sciences and director of the oceanology institute. The monograph is said to be the collective work of a group of specialists. Monin views prospective developments of oceanology and oceanology related research and development, technology and expedition research. Author

N86-25960# Old Dominion Univ., Norfolk, Va. Dept. of Oceanography.
BIOLOGICAL ACTIVITY AT OCEANIC FRONTS Final Report
William M. Dunstan and Kimberley Davis Dec. 1985 40 p
(Contract N00014-84-K-0283)
(AD-A163006) Avail: NTIS HC A03/MF A01 CSCL 08/3

Oceanic fronts, the sharp transition regions between different water masses, exhibit enhanced biological activity which can: (1) mechanically concentrate and/or sort various plankton and particulate substances, including pollutants; (2) stimulate increased autotrophic and heterotrophic productivity, including red tide conditions; (3) affect behavioral patterns such as diurnal vertical movements of plankton and migration of Oceanic Fishes; (4) juxtapose communities that otherwise would not interact, forming new community assemblages; and (5) limit the distributions of various organisms, serving as biogeographical boundaries. Partial contents: Types of fronts; Particle accumulation; Enhancement of plankton biomass and production; Behavioral responses of nekton; Ecological importance of fronts. GRA

N86-25961# California Univ., Santa Cruz. Center for Coastal Marine Studies.
SMALL AND MESOSCALE PROCESSES IN THE MARGINAL ICE ZONE EXPERIMENT
Theodore D. Foster 1985 3 p refs
(Contract N00014-84-K-0144)
(AD-A164297) Avail: NTIS HC A02/MF A01 CSCL 08/10

The primary objective of the research program is to understand the spatial and temporal behavior of the finestructure in the upper ocean of the marginal ice zone and, in particular, to determine the role that internal waves play in determining the behavior of that finestructure. A secondary objective is to provide high quality temperature and salinity profiles from the surface to the bottom in order to supplement the general hydrography of the region and to provide calibration data for other investigators. GRA

N86-25962# Marine Research Inst., Helsinki (Finland).
INVESTIGATION OF ICE DYNAMICS IN THE MARGINAL ICE ZONE Interim Report, 16 May - 30 Sep. 1985
Matti Leppaeranta 30 Sep. 1985 11 p refs
(Contract DAJA45-83-C-0034)
(AD-A164364; IR-6) Avail: NTIS HC A02/MF A01 CSCL 08/12

MIZEX-83 was a pilot study program in the Greenland Sea where ice kinematics data could be collected for about ten days. Ocean current measurements were simultaneously made beneath the same ice floes as we had transponders for the ice kinematics at three stations. The currents were measured with Aanderaa current recorders giving the mean absolute speed and instantaneous direction at ten-minute intervals. The ice kinematics

data describe relative motion between the stations. Thus in comparing ice and current kinematics we consider the relative motion, i.e., spatial fluctuations of velocity between two stations and the rate of deformation given by the three stations. The active role of ice in the ice-ocean system has a consequence that an ocean dynamics model for the ice margin problems should have an advanced ice dynamics model coupled with it. The ice motion was also measured with Argos satellite buoys. They are very good for measuring trajectories. GRA

N86-25963# Naval Ocean Research and Development Activity, Bay St. Louis, Miss.
COASTAL SECCHI DEPTH ATLAS Final Report
Robert A. Arnone Jul. 1985 164 p refs Original contains color illustrations
(AD-A164420; NORDA-83) Avail: NTIS HC A08/MF A01 CSCL 08/10

A seasonal Secchi depth atlas has been developed for the world's coastlines. Optical data have been compiled from data gathered by the National Oceanographic Data Center and from open literature for water depths less than 500 meters. These data have been averaged by one-degree squares, sorted by season, and placed in a category of six classes of Secchi depth ranges. Four charts were used to cover the world at a scale of 1:12,233,000, and four seasons were selected to encompass 3-month intervals. Additionally, annual mean Secchi depths have been compiled in four charts. Secchi depth data were found for approximately 50% of the world's coastlines. In the areas where no optical data were available other oceanographic, meteorologic, and geomorphic data sources were used to estimate the expected Secchi depth ranges. GRA

N86-25964# Naval Postgraduate School, Monterey, Calif.
VARIATION OF FRICTION VELOCITY ACROSS THE SURFACE MARGINAL ICE ZONE IN THE EAST GREENLAND SEA M.S. Thesis
Roberta M. Runge Dec. 1985 92 p refs
(AD-A164497) Avail: NTIS HC A05/MF A01 CSCL 08/12

The Marginal Ice Zone Experiment (MIZEX) took place in the summer of 1984. All data presented are from the 15 June - 15 July time frame of the MIZEX. Of primary concern in the marginal ice zone is the surface stress, which contributes to changing the upper part of the ocean, to ocean eddy formation and dissipation and to ice movement. Investigated are the surface layer wind, temperature and, in particular, the variation of the surface stress in the open water along the marginal ice zone. The stress values were obtained using the dissipation method. These values will be compared to the Large and Pond bulk-formulated drag coefficients, which are open water values. From this comparison, a realistic estimate of atmospheric forcing in the marginal ice zone can be obtained. Author (GRA)

N86-25965# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
FIELD TESTS OF THE KINETIC FRICTION COEFFICIENT OF SEA ICE
Jean-Claude Tatinclaux and David Murdey Oct. 1985 27 p
(AD-A163170; CRREL-85-17) Avail: NTIS HC A03/MF A01 CSCL 08/12

This report presents the results of tests of the ice friction coefficient mu sub k carried out during the May 1984 expedition of the F.S. Polarstern off the coast of Labrador. The test surfaces were Inerta-160-coated steel plates and bare steel plates, hand roughened and sandblasted. The main findings of the studies were: (1) columnar and granular sea ice showed no significant differences in friction coefficient; (2) for columnar ice, mu sub k was independent of ice crystal orientation with respect to test surface; (3) mu sub k was independent of normal pressure applied on ice sample; (4) mu sub k initially decreased with increasing relative velocity between the ice sample and the test surface and reached a steady value at higher speeds; (5) mu sub k increased with increasing surface roughness; (6) a wetting surface exhibited a higher friction coefficient than a non-wetting surface of the same or even higher roughness average. GRA

N86-25966# Naval Postgraduate School, Monterey, Calif.
HYDROGRAPHIC DATA FROM THE OPTOMA PROGRAM, OPTOMA18, 31 OCTOBER AND 2 NOVEMBER 1985 Progress Report, Oct. 1985 - Jan. 1986
Paul A. Wittmann, Marie C. Colton, John J. Rendine, and Christopher N. K. Mooers 17 Dec. 1985 49 p
(AD-A163429; NPS 68-86-001) Avail: NTIS HC A03/MF A01 CSCL 08/10

The OPTOMA (Ocean Prediction Through Observation, Modeling and Analysis) Program seeks to understand the mesoscale (fronts, eddies, and jets) variability and dynamics of the California Current System and to determine the scientific limits to practical mesoscale ocean forecasting. To help carry out the aims of this project, a series of cruises and P3 flights has been planned in two subdomains, NOCAL and CENCAL. Bathythermographic data were acquired with shallow (300m) and deep (700m) AXBT's which were deployed from a Navy P3 aircraft. GRA

N86-25967# National Ocean Service, Rockville, Md.
TIDE TABLES 1986, HIGH AND LOW WATER PREDICTIONS, CENTRAL AND WESTERN PACIFIC OCEAN AND INDIAN OCEAN
Jun. 1985 393 p
(PB86-148434) Avail: NTIS HC A17/MF A01 CSCL 08C

Tide tables for the use of mariners have been published by the National Ocean Service (formerly the Coast and Geodetic Survey) since 1853. The edition of the Tide Tables, Central and Western Pacific Ocean and Indian Ocean contains full daily predictions for 74 reference stations and differences and other constants for about 1,900 stations. It also contains a table for obtaining the approximate height of the tide at any time, a table of local mean time of sunrise and sunset for every 5th day of the year for different latitudes, a table for the reduction of local mean time to standard time, a table for converting feet to meters, a table of the Greenwich mean time of the Moon's phases, apogee, perigee, greatest north and south and zero declination, and the time of the solar equinoxes and solstices, and a glossary of terms. GRA

N86-25968# National Oceanic and Atmospheric Administration, Miami, Fla. Oceanographic and Meteorological Labs.
COMPUTER CODE FOR CALCULATING ACOUSTIC RAY PATHS WITH APPLICATION TO THE STRAITS OF FLORIDA
L. M. Lawson, D. A. Seem, D. R. Palmer, and Y. H. Daneshzadeh Dec. 1985 51 p
(PB86-158391; NOAA-TM-ERL-AOML-62) Avail: NTIS HC A04/MF A01 CSCL 08C

Ocean acoustic tomography is an attractive candidate for monitoring the heat transport in the Florida Current. The feasibiligy of the application of tomography depends on the ability to identify individual ray paths. Although experience shows that paths can be identified with deep ocean propagation, the ray path structure in the Florida Straits is quite different. Here the sound speed is such that a ray path which travels modest distances necessarily experiences bottom bounces. In order to investigate the question of ray path identification, a fast, specialized ray-tracing program was developed. Using the code the authors analyzed the fluctuations in ray path geometry resulting from small perturbations in the bathymetry. The report describes the computer code, and documents the historical data and the numerous ray-tracings calculated for the Florida Straits. GRA

N86-25969# National Ocean Service, Rockville, Md. Office of Oceanography and Marine Assessment.
DIRECTORY OF SELECTED RESEARCH SUPPORTED BY NOAA'S (NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION'S) OCEAN ASSESSMENTS DIVISION
M. B. Matta Jan. 1985 147 p
(PB86-150216; NOAA/SR/NOS/OMA-1) Avail: NTIS HC A07/MF A01 CSCL 08A

The purpose of the report is twofold: it is intended to provide both to the general public and to regional waste managers a summary of the research supported by the National Oceanic and Atmospheric Administration's (NOAA) primary marine pollution division, the Ocean Assessments Division (OAD). The research areas are presented alphabetically-biological effects, chemical fates, physical transport and processes, and syntheses of polluting events. GRA

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N86-25970*# California Univ., San Francisco. Contracts and Grants Office.
PHOTOENERGY TRANSDUCTION IN HALOBACTERIUM HALOBIUM Final Report, 1 Jul. 1975 - 31 Oct. 1985
Walther Stoeckenius and Roberto A. Bogomolni 1985 9 p refs (Grant NsG-7151)
(NASA-CR-176673; NAS 1.26:176673) Avail: NTIS HC A02/MF A01 CSCL 06C

The structure and function of a rhodopsin-like pigment bacteriorhodopsin, discovered and isolated from the membranes of the halophile Halobacterium halobium, were studied. Intermediatesm appearing in the cyclic photoreaction that drives the proton translocation, were spectroscopically characterized. The charge translocation in membrane monolayers and mulitlayers placed between electrodes were kinetically resolved. A model was developed for the proton translocation process, in which the isomerization of the retinal Schiff base decreases its pK to drive the proton off and simultaneously changes the connectivity from the cytoplasmic surface to the external surface. The stoichiometry of proton pumping in intact cells and the effect of the light generated electrochemical potential on the kinetics of the photoreaction cycle and the synthesis of ATP were investigated. B.G.

N86-25971*# Management and Technical Services Co., Washington, D.C.
USSR SPACE LIFE SCIENCES DIGES: INDEX TO ISSUES 1-4
Ronald Teeter and Lydia Razran Hooke Jun. 1986 78 p refs (Contract NASw-3676)
(NASA-CR-3922(06); NAS 1.26:3922(06)) Avail: NTIS HC A05/MF A01 CSCL 06C

This document is an index to issues 1 to 4 of the USSR Space Life Sciences Digest and is arranged in three sections. In section 1, abstracts from the first four issues are grouped according to subject; please note the four letter codes in the upper right hand corner of the pages. Section 2 lists the categories according to which digest entries are grouped and cites additional entries relevant to that category by four letter code and entry number in section 1. Refer to section 1 for titles and other pertinent information. Key words are indexed in section 3. Author

N86-25972# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE FIRST CORTICAL IMPLANT OF A SEMICONDUCTOR MULTIELECTRODE ARRAY. VER (VISUAL EVOKED RESPONSES) AND PROPAGATION ANALYSIS M.S. Thesis
Philip B. Fitzjarrell and Ronald L. Small Dec. 1985 185 p refs
(AD-A164015; AFIT/GE/ENG/85D-15) Avail: NTIS HC A09/MF A01 CSCL 05/10

This thesis reports results of the analysis of data collected from the first cortical implant of an electrode array on the primary visual cortex of a laboratory beagle. No evidence of visual evoked responses (VERs) was found in the data by summation and averaging techniques. Spatial correlation results indicate support of the hyper-column theory. Spatio-temporal correlation results indicate EEG signal propagation among the cortical columns under the array. Lack of any classic VER findings may be due to data digitization errors. Major recommendations include redigitization of the beagle data, as well as procedures for future chip implants and analyses using the Masscomp MC-500 computer. Author (GRA)

N86-25973# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
PHOSPHOROBACTERIN AND ITS EFFECTIVENESS
Ye. N. Mishustin 30 Jan. 1986 60 p refs Transl. into ENGLISH from Izvestiya Timiryazevskoy Sleskokhozyaystvennoy Akademii (USSR), no. 4, 1967 p 65-83
(AD-A164508; FTD-ID(RS)T-1432-84) Avail: NTIS HC A04/MF A01 CSCL 02/1

As a result of works, carried out in institute of agricultural microbiology All-Union Academy of Agricultural Sciences proposed as bacterial fertilizing preparation, phosphorobacterin, which contains culture of spore-forming bacterium Bac. megaterium. This microorganism is capable to destroy organophosphorus compounds and to covert them into the form accessible to plants. Under field conditions phosphorobacterin, i.e., the preparation containing Bac. megaterium, slightly increases the yield of farm crops. According to the data of experimental institutions, the average increase in yield is about 10%. The available data show that phosphorobacterin is more effective on the soils where phosphotoacid fertilizers were applied. This gives rise to doubt as to the thesis that phosphorobacterin mainly improves phosphorus nutrition of plants. One may also consider it proved that Bac. megaterium has not any active propagation on the root surface and in the rhisosphere of plants. This fact makes one give up the theory of R.A. Menkina, the author of phosphorobacterin, about the nature of the relationship between higher plants and Bac megaterium. The available data makes one believe that the effect of phosphorobacterin is due to the presence in Bac. megaterium culture of a number of a biologically active substances stimulating the first stages of the development of bacterial plants. GRA

N86-25974# Department of the Navy, Washington, D. C.
BIOSENSORS FROM MEMBRANE PROTEINS RECONSTITUTED IN POLYMERIZED LIPID BILAYERS Patent Application
Paul Yager, inventor (to Navy) Filed 23 Aug. 1985 18 p
(AD-D012160; US-Patent-Appl-SN-768650) Avail: NTIS HC A02/MF A01 CSCL 06/1

It is an object of the present invention to provide a polymerized lipid membrane which extends the longevity and durability of lipid bilayers used in bioensors. It is another object of this invention to provide a device which is portable and can be used in the field. Another object of the present invention is to provide a quick and easy method for producing rugged biochemical sensors. These and other objects are achieved by extracting membrane proteins from biological cells, reincorporating the proteins into a lipid bilayer contacting the bilayer, containing the membrane proteins with the environment containing the stimulus, and measuring the change in voltage or conductivity across the bilayer. The voltage or conductivity change indicates the presence of the stimulus and the magnitude of the voltage or conductivity change indicates the amount of the stimulus present. The polymerized lipid membrane provides a rugged support for the proteins that function to sense molecules in the external environment. The acetylcholine receptor protein is purified by affinity chromatography reincorporated into lipid vesicles of polymerized lipids, and mounted on a glass microelectrode to produce a lipid bilayer containing the reincorporated proteins. One electrode from the silver-silver chloride pair is mounted on each side of the bilayer. The electrodes can measure the change in current across the bilayer when the acetylcholine receptor protein is effected by cholinergic agonists. GRA

N86-25975# Department of the Navy, Washington, D. C.
MAGNETIC SEPARATION DEVICE Patent Application
George M. Starken, J. Cavin, Richard A. Quinnell, Charles A. Twigg, and Duncan P. Crawford, inventors (to Navy) Filed 25 Sep. 1985 28 p refs
(AD-D012163; US-Patent-Appl-SN-780123) Avail: NTIS HC A03/MF A01 CSCL 06/12

This invention pertains to magnetic separation devices and more particularly to; magnetic separation devices used to selectively

remove magnetic bead-coated cells from tissues such as bone marrow or blood. Depletion of cell populations from boner marrow has been mainly approached using antibodies conjugated to toxins such as ricin or with antibodies complement to effect lysis of the target cells. These techniques have several disadvantages including difficulty in measuring the selective cell kill in the marrow, non-specific toxicity of either toxins or complement, and the necessity to prepare large amounts of complement. In addition, many antibodies are neither cytotoxic with complement nor toxin conjugates. Polymeric microspheres conjugated to antibodies have been used to probe the cell surface for receptor sites using scanning electron microscopy. Iron-containing polymeric microspheres tagged with fluroescent dyes conjugated to antibodies were used to separate red blood cells and lymphoid cells by binding the antibody-microsphere to selected cells and exposing the cell population to a magnetic field. Over 99% of the bound cells were attracted by the magnet. GRA

N86-25976# Ottawa Univ. (Ontario). Dept. of Electrical Engineering.

STUDIES OF THE ELECTRIC FIELD DISTRIBUTION IN BIOLOGICAL BODIES. EXPERIMENTAL DOSIMETRY AT RADIOFREQUENCIES Final Report, Dec. 1981 - Sep. 1985

Stanislaw S. Stuchly and Maria A. Stuchly 5 Dec. 1985 70 p refs

(Contract N00014-82-G-0011)

(AD-A163156) Avail: NTIS HC A04/MF A01 CSCL 06/18

The objective of the project was to develop and evaluate a computer-controlled system for measurements of the spatial distribution of the specific absorption rate (SAR) in biological bodies and to perform measurements on a model of the human body, with particular emphasis on exposures in the near-field of antennas. Far-field exposures at frequencies above 160 MHz, in spite of large gradients, local values of the SAR are only about 20 times higher than the whole-body average SAR for homogeneous models of human body. However, an additional increase by a factor of 4 to 5 can be anticipated at interfaces of high water content tissues with air (gas) pockets and low water content tissues. The existence of large gradients and high local SARs, as confirmed by our results, further supports an accepted view that biological effects at relatively low average SARs are due to thermal interactions. For humans, high SARs occur in the neck, and the ratio of the SAR in the neck to the whole-body average increases with frequency. Near-field exposures, based on the experimental findings we believe that because of the spatial pattern of energy deposition, the whole-body average SAR is not an adequate dosimetric measure for near-field exposures. GRA

N86-25977# Los Alamos National Lab., N. Mex.

DNA ANALYSIS OF EPITHELIAL CELL SUSPENSIONS

J. S. Wilson, N. F. Johnson, and L. M. Holland 1985 22 p refs Presented at the Hanford Life Sciences Symposium, Richland, Wash., 21 Oct. 1985

(Contract W-7405-eng-36)

(DE86-002403; LA-UR-85-3568; CONF-8510225-1) Avail: NTIS HC A02/MF A01

Cell suspensions of skin were obtained by animals exposed by skin painting of several crude oils. DNA analysis of these cell suspensions labeled with mithramycin provide determination of percentages of cells in the G1, S and G2M phases of the cell cycle. Data acquired showed differences from control animals occurring as early as 7 days after treatment and persisting through 21 days afterwards. There was histological evidence of erythema and hyperplasia in shale oil-exposed skins. Flow cytometric analysis of DNA content in shale-oil-exposed skin cells showed an increased percentage of cycling cells plus evidence of aneuploidy. Similar data from simply abraded skin showed increased percentages of cycling cells, but no aneuploidy. The shale-oil-exposed group, when compared to a standard petroleum-exposed group, had significantly increased percentages of cycling cells. This early indication of differing response to different complex mixtures was also seen in long-term skin exposures to these compounds. Similar analytical techniques were applied to tracheal cell suspensions from ozone-exposed rats. DOE

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N86-25978*# Good Samaritan Hospital and Medical Center, Portland, Oreg. Dept. of Neuro-otology.

NORMAL AND ABNORMAL HUMAN VESTIBULAR OCULAR FUNCTION Final Technical Report

Robert J. Peterka and F. Owen Black May 1986 66 p refs

(Contract NCC9-8)

(NASA-CR-176820; NAS 1.26:176820) Avail: NTIS HC A04/MF A01 CSCL 06P

The major motivation of this research is to understand the role the vestibular system plays in sensorimotor interactions which result in spatial disorientation and motion sickness. A second goal was to explore the range of abnormality as it is reflected in quantitative measures of vestibular reflex responses. The results of a study of vestibular reflex measurements in normal subjects and preliminary results in abnormal subjects are presented in this report. Statistical methods were used to define the range of normal responses, and determine age related changes in function. Author

N86-25979# Army Research Inst. of Environmental Medicine, Natick, Mass.

AEROBIC CAPACITY AND CORONARY RISK FACTORS IN A MIDDLE-AGED ARMY POPULATION AD-A163998 HC A02/MF A01

John F. Patton, James A. Vogel, Julius L. Bednek, Jr., Donald Alexander, and Ronald Albright Jan. 1986 23 p refs

(Contract USRIEM-M-10/86)

(AD-A163998) Avail: NTIS HC A02/MF A01 CSCL 06/14

The purpose of this study was to assess the relationship between coronary risk factors (CRF) and aerobic capacity measured by the direct determination of oxygen uptake during maximal exercise testing. Subjects comprised 295 male Army personnel (40 to 53 years of age) who underwent multiple serial screening procedures to include a medical and physical evaluation, calculation of a Framingham risk factor index (RI) and a graded treadmill exercise test (GXT) with the determination of peak oxygen uptake (pVO sub 2). CRF included resting systolic (SBP) and diastolic (DBP) blood pressures, total cholesterol (TC), HDL-C, triglycerides (TRIG), fasting blood sugar (FBS), smoking history, resting ECG, and percent body fat (% BF). The results, although cross sectional, imply that a high level of aerobic capacity is associated with lower coronary risk factors. GRA

N86-25980# Army Research Inst. of Environmental Medicine, Natick, Mass.

FITNESS AND ACTIVITY ASSESSMENTS AMONG US ARMY POPULATIONS: IMPLICATIONS FOR NCHS GENERAL POPULATION SURVEYS

James A. Vogel Jan. 1986 66 p refs

(AD-A164060; USARIEM-M-11/86) Avail: NTIS HC A04/MF A01 CSCL 06/14

The military forces of this country represent the largest population for which physical fitness is routinely assessed. Field measures of aerobic power, muscle strength and muscular endurance, along with body weight, are measured twice yearly in the U.S. Army through age 60. Field measures are defined as those conducted by army units without the aid of equipment or indoor facilities. The purpose of these periodic fitness evaluations is both as an indicator of the adequacy of training to meet performance goals as well as a motivator to the individual to train and improve their fitness level. In addition to these periodic field measures, extensive population surveys of laboratory-measured fitness and activity assessment have been made in a wide variety of Army units over the past ten years by the Exercise Physiology

Division, US Army Research Institute of Environmental Medicine. These assessments have been part of an ongoing research program to study factors influencing fitness in the Army. This chapter presents a description of the survey methods and sample data from both approaches. GRA

N86-25981# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

AN ANALYSIS OF POTENTIAL PREDICTIVE PARAMETERS OF MOTION SICKNESS USING A COMPUTERIZED BIOPHYSICAL DATA ACQUISITION SYSTEM M.S. Thesis

Norman R. Jarvis and Charles T. Uyeda, Jr. Dec. 1985 254 p refs

(AD-A164099; AFIT/GSO/ENG/85D-1) Avail: NTIS HC A12/MF A01 CSCL 06/5

A computerized biophysical data acquisition system was refined and used to collect biophysical data on human volunteer subjects to examine effects of coriolis induced motion sickness. Redesigned sensors to measure electrical cardiac activity, cardiac chest rebound, abdominal/thoracic respiration, peripheral pulse blood volume, facial pulse blood volume, skin temperature, gastric/intestinal activity, nystagmus, and brain wave activity were incorporated with commercially available sensors for galvanic skin response, heart rate, and blood pressure to thoroughly measure the subject's vital signs. Subjects were rotated in a multiaxis motion chair and data collected for later analysis. Data were collected on paper strip chart recorders in parallel with a MASSCOMP MC500 minicomputer. The MASSCOMP data acquisition system software was refined with better documentation to allow data replay. GRA

N86-25982# Kentucky Univ., Lexington. Research Lab.

ULTRASONIC QUANTIFICATION OF BLOOD VOLUME REDISTRIBUTION UNDER HYPERGRAVITY Final Report, Feb. 1981 - Sep. 1985

Pramode K. Bhagat and David R. Brown 15 Jan. 1986 87 p refs

(Contract N00014-85-K-0325)

(AD-A164379) Avail: NTIS HC A05/MF A01 CSCL 06/19

In the operation of high performance aircraft, operational crews are often subject to high sustained + or - GZ acceleration. The response of the human cardiovascular system to these acceleration forces has been the object of considerable research. Numerous techniques have been used to measure important parameters of cardiovascular function; however, plethysmographic measurements of blood volume shifts have not been possible during exposure to hypergravity because of unavoidable tissue deformation. Such measurements have added significantly to understanding of the cardiovascular response to postural shifts and to zero-g. A multi-channel instrument has been developed which employs multiple ultrasonic depth measurements to determine the volume of blood contained in the various compartments of the circulation during exposure to hypergravity on a centrifuge. These volume measurements can be used to study the time course and quantity of blood shifts produced by exposure to selected acceleration profiles and physiological manipulations, including anti-G suit inflation. The data obtained should provide improved understanding of basic cardiovascular physiology and of the relative effectiveness of various anti-G devices. GRA

N86-25983# California Univ., Irvine. Dept. of Community and Environmental Medicine.

COMPARATIVE BIOCHEMISTRY AND METABOLISM. PART 2: NAPHTHALENE LUNG TOXICITY Annual Report, Jun. - Dec. 1984

Paul R. Richieri and Alan R. Buckpitt Nov. 1985 38 p

(Contract F33615-80-C-0512)

(AD-A163144; AAMRL-TR-85-069) Avail: NTIS HC A03/MF A01 CSCL 06/20

The studies reported in this document were to quantitatively examine the diffusion of naphthalene oxide and reactive metabolites form naphthalene in suspensions of isolated mouse hepatocytes and to determine whether the efflux of these metabolites was dependent upon the depletion of intracellular glutathione. The efflux of naphthalene oxide from intact hepatocytes was monitored in incubations containing 3H-glutathione (this tripeptide will not cross the intact hepatocellular membrane) and was based on the measurement of 3H-labelled glutathione adducts. Between 17 and 35% of the total naphthalene oxide formed during the metabolism of naphthalene in the cell was trapped on the exterior of the cell with 3H-glutathione. The fraction of epoxide exiting the hepatocytes as a percentage of the total amount formed did not vary with increasing naphthalene concentrations between 0.005 and 1.5 mM. These data in conjunction with the studies showing that incubation of hepatocytes with naphthalene at concentrations of 0.05 mM or greater caused a significant depletion of intracellular glutathione, suggested that the quantity of naphthalene oxide diffusing as a percentage of the total formed was not dependent upon the intracellular glutathione status. In contrast, the ration of extracellular vs i ntracellular covalent binding was dependent on the concentration of naphthalene in the incubation. GRA

N86-25984# California Univ., Irvine, Dayton, Ohio.

ACUTE TOXICITY STUDIES ON 2 AIR FORCE HYDRAULIC FLUIDS (MLO 82-233 AND MLO 82-585) Technical Report, Apr. 1983 - Mar. 1984

E. R. Kinkead, J. R. Hotron, C. L. Gaworski, and R. A. Salomon Nov. 1985 22 p

(Contract F33615-80-C-0512)

(AD-A163174; AAMRL-TR-85-070) Avail: NTIS HC A02/MF A01 CSCL 06/20

This report describes results of investigations into the acute toxic properties of two operational Air Force hydraulic fluids, MLO 82-233 and MLO 82-585. Various routes of administration were investigated including inhalation, dermal, and oral in rats, guinea pigs, rabbits, and chickens. No acute toxicity occurred in rats with either hydraulic fluid as a results of oral or inhalation exposure at the maximum concentration tested. Dermal exposure of rabbits resulted in no mortalities with either hydraulic fluid. One hydraulic fluid, MLO 82-585, was found to be a moderate skin irritant but neither fluid caused ocular irritation nor did they produce a sensitization response in guinea pigs. Neither fluid would be considered to be a delayed neurotoxin. Author (GRA)

N86-25985# California Univ., Irvine, Dayton, Ohio.

THE EXPERIMENTAL DETERMINATION OF SAFE ATMOSPHERIC EXPOSURE CONCENTRATIONS OF JP-10 JET FUEL Final Technical Report, Jun. 1978 - Jun. 1984

C. C. Haun, E. R. Kinkead, E. H. Vernot, J. D. MacEwen, and R. H. Bruner Nov. 1985 25 p

(Contracts F33615-76-C-5005; F33615-80-C-0512)

(AD-A163179; AAMRL-TR-85-072) Avail: NTIS HC A02/MF A01 CSCL 06/20

Four animal species were exposed for 1 year to 100 ppm (556 cu mg/m) JP-10 to determine its long-term toxic and oncogenic effects. Rats, mice, and hamsters were maintained for 1 year postexposure, while dogs were held for 5 years postexposure. Mean body weights of exposed hamsters and male rats were lower than controls during exposure. Weight recovery occurred in hamsters, but not in male rats during postexposure phase of the study. Significant JP-10 exposure related effects were renal tubular nephrosis together with an increase in benign and malignant renal cell tumors in male rats. Author (GRA)

N86-25986# Los Alamos National Lab., N. Mex.

TOXICOLOGICAL STUDY OF NTO

J. E. London and D. M. Smith Sep. 1985 8 p refs

(Contract W-7405-eng-36)

(DE86-003296; LA-10533=MS) Avail: NTIS HC A02/MF A01

The acute oral LD50 values for NTO for mice and rats are greater than 5 g/kg. According to classical guidelines, the test material would be considered only slightly toxic or practically nontoxic in both species. Skin application studies with NTO in rabbits demonstrated that it was mildly irritating cutaneously. With the scoring scheme, the rabbit eye test was considered negative; however, transient conjunctival and corneal irritation did result from the NTO application in several animals and one developed a chronic

anterior uveitis. The material did not induce sensitization in the intradermal guinea pig assay. DOE

N86-25987# National Center for Health Services Research and Health Care Technology Assessment, Rockville, Md.
CARDIOKYMOGRAPHY
E. Feigenbaum 1985 9 p refs
(PB86-133790; NCHSR-85-127; Rept-10) Avail: NTIS HC A02/MF A01 CSCL 06L

Cardiokymography (CKG) is a non-invasive test to detect stress induced motion abnormalities of the anterior left ventricular wall of the heart for coronary artery disease (CAD). CKG involves translation of heart wall motion into a variable electrical signal that is recorded in graphic form. It may be affected by chest wall motion, systolic rotation of the ventricle, or patient movement. The tracing is a summation of cardio-thoracic movement in the area under the trancuducer. The utility of CKG in detecting CAD remains equivocal. Reassessment of CKG has disclosed that adequate scientific data are lacking with respect to the diagnostic effectiveness of this technology. At the present time cardiokymorgraphy continues to be considered investigational, when used as a method of diagnosing ischemic heart disease. GRA

N86-25988# National Academy of Sciences - National Research Council, Houston, Tex.
EMERGENT TECHNIQUES FOR ASSESSMENT OF VISUAL PERFORMANCE Final Report
Jun. 1985 77 p refs
(Contract N00014-80-C-0159)
(PB86-144755) Avail: NTIS HC A05/MF A01 CSCL 06P

Psychophysical research has revealed in recent years that traditional measures of visual acuity and visual field only partially characterize the information processes of the human observer. A survey of recent psychophysical research that has the potential for broadening conventional assessment of visual function is provided. Areas of practice to which such psychophysical research techniques might be applied, are identified. GRA

N86-25989# Texas Univ. Health Science Center, Houston. School of Public Health.
HEALTH EFFECTS OF AMBIENT OZONE EXPOSURE IN VIGOROUSLY EXERCISING ADULTS
B. J. Selwyn, T. H. Stock, D. E. Jenkins, D. J. Kotchmar, and R. S. Chapman Jan. 1986 21 p refs Sponsored by Health Effects Research Lab. Prepared in cooperation with Baylor College of Medicine, Houston, Tex.
(Grant EPA-CR-807108)
(PB86-156940; EPA-600/D-86-033) Avail: NTIS HC A02/MF A01 CSCL 06E

The purpose of the analysis was to examine the association of changes in ambient ozone concentrations with changes in the pulmonary function (PFT) of healty adults after exercising vigorously outdoors. During May-October, 1981, 24 community residents (men and women) ran three miles twice a week some time between 4:30 and 6:30 P.M. at a high school track near Houston, Texas. An air monitoring trailer stood beside the track and monitored environmental variables continuously. The continuously measured environmental variables in this analysis (ozone, temperature, and relative humidity) were averaged over 15 minute intervals. Standard forced expiratory maneuvers were performed before and after each run. Exercise exertion was standardized. GRA

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N86-25990# Minnesota Univ., Minneapolis. Computerized Adaptive Testing Lab.
PROCEEDINGS OF THE ITEM RESPONSE THEORY AND COMPUTERIZED ADAPTIVE TESTING CONFERENCE Final Report
David J. Weiss Apr. 1985 382 p Conference held at Wayazata, Minn., 27-30 Jun. 1982
(Grant N00014-82-G-0061)
(AD-A163040) Avail: NTIS HC A17/MF A01 CSCL 05/10

This report is the Proceedings of the 1982 Item Response Theory and Computerized Adaptive Testing Conference held July 27-30, 1982 at the Spring Hill Conference in Wayzata, Minnesota. These Proceedings include all papers presented at the conference and discussions of these papers by the scheduled discussants. The papers are organized into the following sessions: (1) Development in Latent Trait Theory; (2) Parameter Estimation; (3) Multidimensional Item Response Theory; (4) Estimating Parameters with the E-M Algorithm; (5) Unidimensionality and Robustness; (6) Adaptive and Sequential Testing; (7) Latent Trait Models forSpecial Applications; and (8) Applications of Computerized Adaptive Testing. GRA

N86-25991# Air Force Human Resources Lab., Brooks AFB, Tex.
THEORY-BASED COGNITIVE ASSESSMENT Interim Paper, Oct. 1984 - Sep. 1985
Patrick C. Kyllonen Jan. 1986 35 p refs
(AD-A164083; AFHRL-TP-85-30) Avail: NTIS HC A03/MF A01 CSCL 05/10

This paper reviews the theoretical foundations, current issues, and a number of recent studies in the area of cognitive ability assessment, with particular focus on personnel selection and classification applications. A brief review of the history of aptitude testing is provided, with particular emphasis on the cognitive psychology, along with the availability of modestly priced microcomputer systems, hold promise for improvements in ability assessment technology. Recent studies conducted at the Air Force Human Resources Laboratory as part of the Learning Abilities Measurement Program and similar projects are reported. The focus of these studies has been on determining (1) the utility of various cognitive tasks for providing meaningful information on individual cognitive skill levels, (2) whether such tasks tap abilities not measured by currently operational paper-and-pencil tests, and (3) how changes in processing efficiency can be analyzed. Cognitive diagnostic as well as selection-and-classification applications are discussed. GRA

N86-25992# Engineering Research Associates, Inc., Vienna, Va.
SCHEMA-BASED THEORY OF INFORMATION PRESENTATION FOR DISTRIBUTED DECISION MAKING Interim Report
David F. Noble and Joseph A. Truelove Aug. 1985 120 p refs (Contract N00014-84-C-0484)
(AD-A163150; R-028-85) Avail: NTIS HC A06/MF A01 CSCL 05/10

The Schema-Based Theory of Information Presentation for Distributed Decision Making describes a schema structure appropriate for understanding connections between the way that information is presented and its impact on distributed decision making. The theory suggests a process for determining how information should be presented so that consensus and coordination will be improved and decision conflicts will be reduced. The theory proposes that experienced decision makers select alternatives by mental processes that match the features of the current situation to features of reference situations for which possible alternatives are known to be appropriate. These reference situations may specify particular threat activities and dispositions, own Battle Group objectives, prescribed contingency plan action, and decision behavior of other decision makers to the group. Information presented according to the principles derived from the theory will encourage each decision maker to more fully consider the impact of each action on the objectives of other decision makers. Applying the principles requires that the general schema used by decision makers be determined prior to the time when particular situation-specific information is presented. Given this prior determination, the principles sugg est what emphasis needs to be given to specific features and feature relationships in the presentation of the current situation. GRA

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N86-25993# School of Aerospace Medicine, Brooks AFB, Tex.
A SMALL OXYGEN CONCENTRATOR Final Report, Jun. 1983 - Jul. 1984
Clarence F. Theis, Kenneth G. Ikels, and Roland G. Dornes Dec. 1985 25 p
(AD-A163145; USAFSAM-TR-85-18) Avail: NTIS HC A02/MF A01 CSCL 06/11

Onboard oxygen generating systems (OBOGS) require large quantities of air. When toxic contaminants are present, this air volume can become a problem. A small oxygen concentrator (SOC) was developed to operate at 10% the air volume and 4% the molecular sieve weight of the OBOGS. This paper gives detailed instructions on the construction of the SOC. The SOC was tested at inlet pressures of 10, 20, 30, and 40 psig and at product flows of 0.25, 0.50, 1.00, and 1.50 lpm. The SOC beds were packed with 5A or 13X molecular sieve. Additional tests were conducted with the SOC beds at 25 C, 50 C, and 60 C and using 5A molecular sieve. The SOC performance at various inlet pressures and temperatures, as measured by the oxygen concentration in the product gas, demonstrates characteristics similar to the performance of the full-size OBOGS. GRA

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N86-25994*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CUMULATIVE REPORTS AND PUBLICATIONS THROUGH DECEMBER 31, 1985 Final Report
Apr. 1986 45 p
(Contracts NAS1-18107; NAS1-17070; NAS1-17130; NAS1-15810; NAS1-16394; NAS1-4101; NAS1-14472)
(NASA-CR-178088; NAS 1.26:178088) Avail: NTIS HC A03/MF A01 CSCL 12A

A complete list of ICASE Reports are contained. Since ICASE Reports are intended to be preprints of articles that will appear in journals or conference proceedings, the published reference is included when it is available. Author

N86-25995*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STENCILS AND PROBLEM PARTITIONINGS: THEIR INFLUENCE ON THE PERFORMANCE OF MULTIPLE PROCESSOR SYSTEMS Final Report
Daniel A. Reed, Loyce M. Adams, and Merrell L. Patrick May 1986 48 p refs Submitted for publication
(Contracts NAS1-17070; NAS1-18107)
(NASA-CR-178102; ICASE-86-26; NAS 1.26:178102) Avail: NTIS HC A03/MF A01 CSCL 12A

Given a discretization stencil, partitioning the problem domain is an important first step for the efficient solution of partial differential equations on multiple processor systems. Partitions are derived that minimize interprocessor communication when the number of processors is known a priori and each domain partition is assigned to a different processor. This partitioning technique uses the stencil structure to select appropriate partition shapes. For square problem domains, it is shown that non-standard partitions (e.g., hexagons) are frequently preferable to the standard square partitions for a variety of commonly used stencils. This investigation is concluded with a formalization of the relationship between partition shape, stencil structure, and architecture, allowing selection of optimal partitions for a variety of parallel systems. Author

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N86-25996# Hanford Engineering Development Lab., Richland, Wash.
USE OF A PERSONAL COMPUTER FOR INSTRUMENTATION TESTING AT THE FFTF
D. A. Clark 1985 7 p Presented at the International Topical Meeting on Computer Applications for Nuclear Power Plant Operation, Pasco, Wash., 9 Sep. 1985
(Contract DE-AC06-76FF-02170)
(DE85-018469; HEDL-SA-3279-FP; CONF-850903-21) Avail: NTIS HC A02/MF A01

The FFTF uses computers to assist in performance of instrumentation calibration checks for Technical Specification compliance. When the computers used for these checks are not available, backup methods must be used. A method of using a personal computer to serve as a backup is discussed, and the hardware used is described. DOE

N86-25997# Argonne National Lab., Ill.
PRELIMINARY REPORT ON THE FORMAL ANALYSIS OF THE DRAPER FTP HARDWARE AND SOFTWARE USING ITP
G. H. Chisholm, J. Kljaich, B. T. Smith, and A. S. Wojcik Sep. 1985 24 p
(Contract W-31-109-eng-38)
(DE86-003985; ANL/MCS-TM-59) Avail: NTIS HC A02/MF A01

The purpose of this project is to explore the feasibility of a total design approach to fault-tolerant digital computer systems. A fault-tolerant computer system is one which has the ability to produce correct results even in the presence of any single fault. The total design approach of this project will attempt to show that both the software and the hardware that comprise the system meet specified availability and reliability criteria. This preliminary report discusses the motivation for the project, the need for a formal technique for the verification of fault-tolerance of both hardware and software, discusses preliminary results, and presents recommendations for further work. DOE

N86-25998# Florida State Univ., Tallahassee.
SUPERCOMPUTER RESEARCH DURING 1985 Annual Report, 1984 - 1985
1985 48 p
(Contract DE-FC05-85ER-25000)
(DE86-004283; DOE/ER-25000/1) Avail: NTIS HC A03/MF A01

The Supercomputer Computations Research Institute is an interdisciplinary program in computational science. The project is organized to do research in computational science, to train research people in a variety of academic disciplines and to provide them access to a supercomputer. The program gathers together research people in various disciplines that are vitally involved users of supercomputers. The resulting interactions and exchange of ideas not only enhance output of research in the various disciplines, but also lead to the discovery and propagation of new computational techniques. Due to this close association of science and

engineering users, mathematicians, computer scientists and computer manufacturers, there are synergistic beneficial consequences to research output in various fields and in the supercomputer industry. Some of the software projects in progress or being planned include: a CYBER timesharing system (like the CTSS system at Livermore), research on vectorization techniques, vectorizer compiler development, techniques and tools for multiprocessing, vectorized and parallelized numerical methods and algorithms, fast partial differential equation solvers, and the establishment of DOE user libraries for the supercomputers that we have. Some of the research projects in progress or being planned by SCRI scientists include: lattice gauge theory, data processing for high energy experimental particle physics, accelerator design, many body problems, Monte Carlo techniques, event simulation, meteorology, oceanography, geophysical fluid dynamics, computational fluid dynamics, symbolic manipulation programs, materials by design, and molecular dynamics. DOE

N86-25999# Stanford Univ., Calif. Dept. of Statistics.
DATA BASE MANAGEMENT: PROCEEDINGS OF A CONFERENCE
31 Jul. 1985 307 p refs Conference held in Monterey, Calif., 1-2 Nov. 1984
(Contract N00014-76-C-0476; NR Proj. 042-267)
(AD-A158285) Avail: NTIS HC A14/MF A01 CSCL 09/2

Data base management systems were discussed. Topics included data base organization for statistical analysis; machine learning; information retrieval; information management; and computer architecture. For individual titles, see N86-26000 through N86-26007.

N86-26000# Stanford Univ., Calif. Dept. of Medicine and Computer Science.
DATABASES FOR STATISTICS
Cio Wiederhold *In its* Data Base Management 31 Jul. 1985 p 1-12 refs (For primary document see N86-25999 16-60)
Avail: NTIS HC A14/MF A01 CSCL 09/2

The current status of areas where statistics use and database technology interact is summarized. The fields of database and statistics are both in an advanced state of development. However, their interaction is still in a primitive stage. Databases specifically designed for managing data which are subject to statistical analysis are discussed. A number of definitions are included in the context of a discussion of basic data base concepts. Some implementation issues are presented and Specific Data Base Management Systems (DBMS) are mentioned. Author

N86-26001# Stanford Univ., Calif. Dept. of Compute Science.
DISCOVERY, CONFIRMATION, AND INCORPORATION OF CAUSAL RELATIONSHIPS FROM A LARGE TIME-ORIENTED CLINICAL DATA BASE: THE RX PROJECT c82
Robert L. Blum *In its* Data Base Management 31 Jul. 1985 p 13-55 refs (For primary document see N86-25999 16-60)
Avail: NTIS HC A14/MF A01 CSCL 09/2

The objectives of the methods and computer implementation presented are: (1) to automate the process of hypothesis generation and exploratory analysis of data in large nonrandomized, time-oriented clinical data bases; (2) to provide knowledgeable assistance in performing studies on large data bases; and (3) to increase the validity of medical knowledge derived from nonprotocol data. The RX computer program consists of a knowledge base (KB), a discovery module, a study module and a clinical data base. The KB contains medical and statistical knowledge hierarchically organized and is used to assist in the discovery and study of new hypotheses. Confirmed results from the data base are automatically encoded into the KB. The discovery module uses lagged, nonparametric correlations to generate hypotheses. These are studied by the study module which automatically determines confounding variables and methods for controlling their influence. In determining the confounders of a new hypothesis the study module uses previously 'learned' causal relationships. The study module selects a study design and statistical method based on knowledge of confounders and their distribution in the data base. Author

N86-26002# RAND Corp., Santa Monica, Calif.
CODA: A CONCEPT ORGANIZATION AND DEVELOPMENT AID FOR THE RESEARCH ENVIRONMENT
James A. Dewar and James J. Gillogly *In* Stanford Univ. Data Base Management 31 Jul. 1985 p 57-78 Previously announced as N85-30715 (For primary document see N86-25999 16-60)
Avail: NTIS HC A14/MF A01 CSCL 09/2

The hypothesis is that computers can aid the policy research process by acting as a long term memory (storage and retrieval facility) for the researcher's growing data base and changing concepts. A system called CODA (for concept organization and development aid) is discussed. The authors describe the prototype system built for testing this hypothesis, the system's capabilities and limitations, some of the details of its user interface, what they have learned both from the building and testing of the system and, finally, some thoughts on further capabilities that appear amenable to computer implementation that might aid the policy researcher. The CODA program most properly qualifies as a file management menu-driven system aimed at small data bases and a very limited number of users. It is a system designed and implemented by users (policy researchers) for testing some concepts about the users' environment. It is not particularly suited for large data bases or numerical processing. Author

N86-26003# California Univ., Berkeley. Lawrence Berkeley Lab.
SCIENTIFIC INFORMATION = DATA + META-DATA c82
John L. McCarthy *In* Stanford Univ. Data Base Management 31 Jul. 1985 p 79-124 refs (For primary document see N86-25999 16-60)
Avail: NTIS HC A14/MF A01 CSCL 09/2

Data and metadata (data about data) management systems are described. Key concepts about data and metadata are introduced. A typology of metadata with special emphasis on scientific and technical needs is outlined. The use of different kinds of metadata at various stages of scientific research and analysis is described. Principles for representation of metadata are discussed. The application of self describing files, data management systems, statistical analysis packages and data analysis environments to integrate management of data and metadata are considered. Author

N86-26004# San Jose State Univ., Calif.
PUT THE INFORMATION IN THE DATABASE, NOT THE PROGRAM c82
James L. Dolby *In* Stanford Univ. Data Base Management 31 Jul. 1985 p 125-139 refs (For primary document see N86-25999 16-60)
Avail: NTIS HC A14/MF A01 CSCL 09/2

A small data set and the command TOTAL are discussed. The data set is shown as it is represented in a standard relational data base system for a microcomputer. The data base system's command TOTAL can be exercised interactively. The system differentiates between character strings and numerical strings and it allows for 8-character names for variables. The system is an interactive data analysis system. It seems feasible to construct such systems which will operate on modest computers. Author

N86-26005# Pacific Northwest Lab., Richland, Wash.
MANAGING THE DATA ANALYSIS PROGRESS c82
W. L. Nicholson, P. J. Cowley, D. B. Carr, and M. A. Whiting *In* Stanford Univ. Data Base Management 31 Jul. 1985 p 141-166 refs (For primary document see N86-25999 16-60)
Avail: NTIS HC A14/MF A01 CSCL 09/2

Advances in statistical computing allowed data analyses to handle increasingly complex problems. The complex data analyses that are required with complex problems proliferate derived data structures and create evolving analysis states. A system that helps the data analyst manage the analysis process through use of data analysis save-states was designed. The system also makes use of graphical interaction, provides organization of command logs and encourages extensive annotation. It is clear that this collaborative effort of data analysts and computer scientists is

making progress toward freeing the data analyst from much mundane, but necessary, organization bookkeeping. Author

N86-26006# Computer Horizons, Inc., Cherry Hill, N. J.
LINKING SCIENCE, TECHNOLOGY AND ECONOMICS DATA
Francis Narin *In* Stanford Univ. Data Base Management 31 Jul. 1985 p 167-214 refs (For primary document see N86-25999 16-60)
Avail: NTIS HC A14/MF A01 CSCL 09/2

Some of the state-of-the-art of linking science, technology and economics data are summarized. The linkage between technology and science is analyzed by analyzing the citations (references). It is concluded that: (1) funds and scientific publication are tightly linked at national and institutional levels; (2) cross-national, cross-institutional, geographic and subject-to-subject science linkages are quantifiable and mappable and reveal that the spectrum of activity from funds, to pubs, to patents, to productivity is reflected in highly correlated statistics; (3) citations from patents to papers document a close day-to-day relationship between science and technology; (4) the science used by patented technology is very recent - implying little or no lag between discovery and utilization; and (5) technology, like science, may be driven by a small number of key highly cited events. Author

N86-26007# Institute for Scientific Information, Inc., Philadelphia, Pa.
THE WORLD BRAIN TODAY: SCIENTOGRAPHIC DATABASES. WHAT ARE THEY, HOW ARE THEY CREATED AND WHAT ARE THEY USED FOR?
George Vladutz *In* Stanford Univ. Data Base Management 31 Jul. 1985 p 215-299 refs (For primary document see N86-25999 16-60)
Avail: NTIS HC A14/MF A01 CSCL 09/2

The creation of automatized intelligent systems which could contribute to increasing the overall productivity of scientific research requires knowledge representation tools of global scale. The automatic compilation from existing databases of an intermediary type of knowledge representation is proposed in the form of a detailed concept dependency diagram of global scope. The relationships are outlined between concept dependency diagrams and detailed knowledge representations based on predicate calculus language and full formalization. The efforts aimed at the representation of the structure of scientific fields, mainly on the basis of citation data, are reviewed. The prospects for the development of related methods for the computerized compilation of regional and global concept maps in the form of concept dependency diagrams are discussed. Author

N86-26008# Massachusetts Inst. of Tech., Cambridge. Center for Information Systems Research.
IMS DESIGN--ALTERNATIVES, ANALYSIS, AND STRATEGIES. REVISION
Michael J. Abraham Dec. 1985 60 p refs
(Contract N00039-80-0498)
(AD-A163505; TR-17-Rev) Avail: NTIS HC A04/MF A01 CSCL 09/2

It is expected that future high-performance Data Base Management Systems will be required to provide storage capacities and transaction rates several orders of magnitude greater than those of any current systems. To meet the requirements for increased speed, capacity, and availability the IMS Data Base Computer (INFOPLEX) employs a highly parallel, distributed control architecture. The preliminary INFOPLEX design consists of two logically and physically separate components: a physical storage hierarchy and a functional hierarchy. The general structure of an INFOPLEX data storage hierarchy has been developed and a preliminary set of control algorithms has been proposed. This report presents a refind architectural specification and outlines a set of control algorithms which take advantage of theoretical properties of INFOPLEX-like storage systems. Sect 2 discusses the overall rationale for the INFOPLEX hierarchial design concept. Sect 3 presents the details of the design issues and tradeoffs related to performance and reliability, and develops a general strategy for efficient READ/WRITE control and reliable fault handling. Finally, Sect 4 summarizes this report, and indicates the directions for further research. GRA

N86-26009# Massachusetts Inst. of Tech., Cambridge. Center for Information Systems Research.
HARDWARE FEASIBILITY OF INFOPLEX DESIGN STRATEGY. REVISION
H. D. Toong and Amar Gupta Mar. 1985 37 p refs
(Contract N00039-81-C-0663)
(AD-A163506; CISR-TR-18-Rev) Avail: NTIS HC A03/MF A01 CSCL 09/2

Among its several design objectives, the key goals of INFOPLEX are to support an extremely large size of databases and to provide an unprecedented level of speed and efficiency in making database transactions. At another level, INFOPLEX attempts to dispense with the traditional approach of using monolithic mainframes. Instead, the design envisages use of arrays of relatively inexpensive microprocessors to allow for fast retrievals and to guarantee adequate fault tolerance capabilities. These microprocessors need to be interconnected in an optimal manner to provide maximum system throughput. Concurrent multiprocessor operation represents one of the key ingredients of the hardward design strategy of INFOPLEX. GRA

N86-26010# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DESIGN AND IMPLEMENTATION OF HIGH PERFORMANCE CONTENT-ADDRESSABLE MEMORIES M.S. Thesis
Wook H. Shinn Dec. 1985 106 p refs
(AD-A163995; AFIT/GE/ENG/85D-39) Avail: NTIS HC A06/MF A01 CSCL 09/5

The content addressable memories (CAMs) have major applications in developing areas of artificial intelligence and image processing. This work involves researching, designing, and implementing a high performance, high density CAM. The design, fabrication, and test of this all-parallel AFIT CAM is discussed. The AFIT CAM stores 2K bits of information and fits in 64 pin dual-in-line package. It was fabricated using a 3 micron CMOS technology with 2-layer metals. The AFIT CAM supports four types of comparisons directly on the chip. These are equal, not-equal, greater-than-or-equal, and less-than. In addition, it has DUMP and Parallel Write operations to aid artificial intelligence and image processing applications. The AFIT CAM has a total of 78,000 devices and achieves a density of 1,073 devices per sq. mm. The memory access time for reading and writing are only 22 ns and 20 ns respectively. The CAM chip computes 800 million magnitude comparisons or 3.2 billion equality comparisons per second. The cif file has been resubmitted to the manufacturer for fabrication due to a short circuit which was caused by over bloated second metal lines. A second version of the AFIT CAM cell was redesigned and nets a 25% reduction in size. Author (GRA)

N86-26011# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DEVELOPMENT AND IMPLEMENTATION OF THE X.25 PROTOCOL FOR THE UNIVERSAL NETWORK INTERFACE DEVICE (UNID2.) VOLUME 1 M.S. Thesis
Mark W. Weber Dec. 1985 273 p refs
(AD-A164076; AFIT/GE/ENG/85D-52-Vol-1) Avail: NTIS HC A12/MF A01 CSCL 09/2

This thesis describes the continued development of an improved Universal Network Interface Device (UNID 2). The UNID 2 architecture was based on a preliminary design project at the Air Force Institute of Technology. The UNID 2 contains two main hardware modules; an local module for the network layer software and a network module for the data link layer software and physical layer interface. Each module is an independent single board computer (SBC) residing on an Intel multibus chassis, complete with its own memory (EPROM and RAM), serial link interfaces, and multibus interface. The local module is an iSBC 544 and the network module is an iSBC 88/45. The network layer software supports the CCITT X.25, datagram option, protocol and the data

link layer software supports the CCITT X.25 LAPB (HDLC) protocol. This report documents the further implementation of the CCITT X.25 protocol in the UNID 2 design. GRA

N86-26012# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DESIGN OF THE HUMAN-COMPUTER INTERFACE FOR A COMPUTER AIDED DESIGN TOOL FOR THE NORMALIZATION OF RELATIONS M.S. Thesis
Thomas C. Mallary Dec. 1985 162 p refs
(AD-A164100; AFIT/GCS/ENG/85D-8) Avail: NTIS HC A08/MF A01 CSCL 09/2

The project involved the design and implementation of the human-computer interface of a computer aided design tool used in conjunction with a relational database. The tool gives a database administrator an interactive means of specifying functional dependencies for a given relation. It then executes a nonloss decomposition, normalizing the original relation to third normal form. Background information is provided on the fundamentals of a relational database and on the concept of functional dependencies. An understanding of the term user-friendly system is developed, together with a summary of state-of-the-art techniques and guidelines meant to help the system designer create more friendly interfaces. The program development process used in the project is described in detail. Major design issues of the project are described, with emphasis placed on areas impacting the system's human-computer interface. A tool is developed to measure and quantify the extent of user satisfaction in the software system. The measurement tool is implemented by a test group asked to evaluate the normalization tool interface. Results of the evaluation are presented. GRA

N86-26013# Cincinnati Univ., Ohio.
STRUCTURED MICROCONTROLLER DESIGN USING PLA FIRMWARE Final Report, 19 Apr. 1982 - 18 Oct. 1985
Christos A. Papachristou 12 Dec. 1985 48 p refs
(Contract DAAG29-82-K-0106)
(AD-A164255; ARO-18626.12-EL) Avail: NTIS HC A03/MF A01 CSCL 09/2

The objective of this research is to contribute a design methodology for microprogramming architectures with supporting firmware and development tools. Two PLA-based microcontrol architectures have been proposed that are suitable for modular microprogramming. The first scheme consists of a PLA sequence store, a microcode ROM and an address processor. This structure has the capability of complex microsequencing such as multiway branching, microsubroutines, nested microlooping and the like. To alleviate the pin-limitation problem, a bit-slice approach is taken in the second scheme which allows for easy microcontrol expandability and compaction of the sequence store. Firmware support for the microcontrollers is provided by such control constructs as if-then-else, while-do and the like, which are available at the microlevel. Several firmware design tools have been developed and incorporated into a software package, MMDS, a Modular Microprogram Development System. MMDS includes the following tools: a microcode assembler, a microsequencer assembler, a PLA code formatter and a functional-level simulator of modular microarchitectures. GRA

N86-26014# Air Force Human Resources Lab., Brooks AFB, Tex.
COMPUTER-BASED TRAINING: IMPLEMENTATION AND SYSTEM Final Report
Joseph Y. Yasutake Jan. 1986 18 p refs
(AD-A164283; AFHRL-TP-85-40) Avail: NTIS HC A02/MF A01 CSCL 09/2

Following a series of preliminary studies in the early 1970's, the United States Air Force embarked on a major research and development effort to design, demonstrate, and evaluate a computer-based instructional system at a major technical training center. The system, called the Advanced Instructional System (AIS), was developed to demonstrate the feasibility of managing and administering individualized instruction for up to 2,000 students daily in four technical training courses. A major state-of-the-art advancement was an integrated computer-based support capability that provided a full range of computer-based instruction functions, including course development and presentation, resource allocation and scheduling, and individual student management. A unique feature was the Adaptive Model, which produced student prescriptions based on tradeoffs among learning requirements, student characteristics, and resource availability. To support the integrated CBI system, a higher-order language called CAMIL (Computer-Assisted/Managed Instructional Language) was developed. Hardware support was provided by a CYBER 73-16 computer with 10 management terminals and 50 interactive terminals. This paper describes the background of the AIS, summarizes the evaluation data, and discusses current efforts underway as a result of lessons learned from the AIS demonstration program. GRA

N86-26015# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AUTOMATED DESIGN OF REAL-TIME, MICROPROCESSOR-BASED CONTROLLERS, VOLUME 1 M.S. Thesis
Ronald L. Heacock Sep. 1985 179 p refs
(AD-A164326; AFIT/GCS/ENG/85S-1-Vol-1) Avail: NTIS HC A09/MF A01 CSCL 09/2

This thesis determined the conceptual and implementation limitations in the use of the Control System Design Language and its timing analysis program and realization libraries for the automated design of real-time, microprocessor-based controllers. Changes were made to the language syntax and timing analysis program to permit a more accurate analysis of the timing requirements of a controller. Conceptual and implementation errors in the primitives of the original realization volume were addressed and solutions presented. A new realization volume using the memory-mapped input/output architecture of the Motorola 6800 microprocessor was developed to determine any bias toward device oriented input/output in the existing primitive designs. A partial Intel 8088 volume was constructed to investigate the applicability of the primitive designs in a segmented memory processor. A volume builder program was developed to aid in the construction and formatting of the realization volumes. A major design effort using the Field Interface Device of an Energy Monitoring and Control System as an example was performed to thoroughly exercise the timing analysis program. Author (GRA)

N86-26016# Oklahoma State Univ., Stillwater. Electronics Lab.
LAIRTS PIXEL DATA FORMATTER
Claude M. Gwinn Aug. 1985 19 p refs
(Contract F19628-85-C-0006)
(AD-A164512; AFGL-TR-85-0192; SR-1) Avail: NTIS HC A02/MF A01 CSCL 09/2

The Oklahoma State University Electronics Laboratory designed a system to assemble the asynchronous data from a pixel array together with the required housekeeping (HSKP) data and format these data into a synchronized PCM bit stream for magnetic tape recording. This report covers in detail the design of the pixel data storage system and its entry into the bit stream. The format requires a minor frame length of 132 words and a subframe length of 128 frames. There was very little available information on the amount of HSKP data that would be required. However, very simple modifications to the formatter would accommodate extra HSKP words and they are relatively easy to format. GRA

N86-26017# Department of the Air Force, Washington, D.C.
PORTABLE MINICOMPUTER FOR TESTING MEMORIES Patent
Carleston O. Brown, inventor (to Air Force) 17 Dec. 1985 16 p
(AD-D012130; US-Patent-4,559,626; US-Patent-Appl-SN-482127; US-Patent-Class-371-21) Avail: US Patent and Trademark Office CSCL 09/2

This patent is a portable high speed minicomputer tester for isolating failures in a random access memory. The device includes a central processing unit having an address counter and means for generating a plurality of test words. Individual test words are generated automatically and stored in both an internal memory and the memory under test. At a predetermined address, a test

word is read out of the memories and compared. If there are any discrepancies, the minicomputer sets a latch corresponding to the failed test word bit and identifies the failed bit on a digital display readout. Using fault conversion tables, an operator can trace a discrepancy to the bit location of a memory chip in the memory under test. GRA

N86-25544# Joint Publications Research Service, Arlington, Va.
MICROCOMPUTER-BASED MULTIFUNCTION, MINI-MULTICHANNEL ANALYZER
Jingjin Wang, Ying Chen, Yixiang Wei, Putang Zheng, Hongrei Zhang, Weitong Ji, and Xuehua Qiu *In its* China Report: Science and Technology (JPRS-CST-86-001) 17 Jan. 1986 p 80-84 ref Transl. into ENGLISH from Hedianzixue yu Tance Jishu (Beijing, China), v. 5, no. 5, Sep. 1985 p 297-299 (For primary document see N86-25539 16-31)
Avail: NTIS HC A06/MF A01

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N86-26018*# TRW Defense Systems Group, Huntsville, Ala. Dept. of Mechanical Engineering and Mechanics.
GROUND SOFTWARE MAINTENANCE FACILITY (GSMF) USER'S MANUAL Final Report
V. Aquila, D. Derrig, and G. Griffith Washington NASA 26 Feb. 1986 180 p
(Contract NAS8-32350)
(NASA-CR-178805; NAS 1.26:178805; TRW-41849-G-159-025) Avail: NTIS HC A09/MF A01 CSCL 09B

Instructions for the Ground Software Maintenance Facility (GSMF) system user is provided to operate the GSMF in all modes. The GSMF provides the resources for the Automatic Test Equipment (ATE) computer program maintenance (GCOS and GOAL). Applicable reference documents are listed. An operational overview and descriptions of the modes in terms of operator interface, options, equipment, material utilization, and operational procedures are contained. Test restart procedures are described. The GSMF documentation tree is presented including the user manual. B.G.

N86-26019# Los Alamos National Lab., N. Mex.
REVIEW OF THE LITERATURE ON BI-LEVEL MATHEMATICAL PROGRAMMING
C. D. Kolstad Oct. 1985 22 p refs
(Contract W-7405-eng-36)
(DE86-004377; LA-10284-MS) Avail: NTIS HC A02/MF A01

This paper reviews the recent literature on applications and algorithms in bi-level programming. Bi-level programming involves two mathematical programs. One math program is concerned with minimizing w(x,t) over some region by varying the vector t. The variable x is actually a function x(t) and is defined implicitly as the solution vector to the second math program, which minimizes s(x,t) over some region by varying x. The review is divided into two main sections. One section covers applied problems that have been presented in the literature as bi-level math programs. Most such applications are in economics but some are in warfare planning. Another section of the paper concerns the many diverse algorithms that have been developed to solve the bi-level programming problem. DOE

N86-26020# Oak Ridge National Lab., Tenn.
ROBOT NAVIGATION ALGORITHMS USING LEARNED SPATIAL GRAPHS
S. S. Iyengar, C. C. Jorgensen, S. V. N. Rao, and C. R. Weisbin Dec. 1985 29 p refs
(Contract DE-AC05-84OR-21400)
(DE86-004649; ORNL/TM-9782) Avail: NTIS HC A03/MF A01

Finding optimal paths for robot navigation in known terrain has been studied for some time but, in many important situations, a robot would be required to navigate in completely new or partially explored terrain. We propose a method of robot navigation which requires no pre-learned model, makes maximal use of available information, records and synthesizes information from multiple journeys, and contains concepts of learning that allow for continuous transition from local to global path optimality. The model of the terrain consists of a spatial graph and a Voronoi diagram. Using acquired sensor data, polygonal boundaries containing perceived obstacles shrink to approximate the actual obstacles' surfaces, free space for transit is correspondingly enlarged, and additional nodes and edges are recorded based on path intersections and stop points. Navigation planning is gradually accelerated with experience since improved global map information minimizes the need for further sensor data acquisition. Our method currently assumes obstacle locations are unchanging, navigation can be successfully conducted using two-dimensional projections, and sensor information is precise. DOE

N86-26021# Sandia National Labs., Albuquerque, N. Mex.
FORTRAN PROGRAM FOR MODELING STEADY LAMINAR ONE-DIMENSIONAL PREMIXED FLAMES
R. J. Kee, J. F. Grcar, M. D. Smooke, and J. A. Miller Dec. 1985 114 p refs
(Contract DE-AC04-76DR-00789)
(DE86-004485; SAND-85-8240) Avail: NTIS HC A06/MF A01

This report documents a Fortran computer program that computes species and temperature profiles in steady-state burner-stabilized and freely propagating pre-mixed laminar flames. The program accounts for finite rate chemical kinetics and molecular transport. After stating the appropriate governing equations and boundary conditions, we discuss the finite difference discretization and the Newton method for solving the boundary value problem. Global convergence of this algorithm is aided by invoking time integration procedures when the Newton method has convergence difficulties. The program runs in conjunction with preprocessors for the chemical reaction mechanism and the transport properties. Discussion of two example problems illustrates many of the program's capabilities. DOE

N86-26022# Lawrence Livermore National Lab., Calif.
LAWRENCE LIVERMORE NATIONAL LABORATORY GRANULAR FLOW PROJECT Quarterly Report, Oct. - Dec. 1985
O. R. Walton, ed. 30 Dec. 1985 10 p refs
(Contract W-7405-eng-48)
(DE86-005088; UCID-20297-85-4) Avail: NTIS HC A02/MF A01

LLNL's Granular Flow Project is developing and utilizing new discrete particle computer models to determine the rheologic characteristics of idealized granular solids under various flow conditions. During FY 1985 two-dimensional granular material models of assemblies of inelastic, frictional, circular disks were developed and utilized in various parameter studies. During the current reporting period we completed an initial parameter study of steady shearing flows of idealized granular materials consisting of assemblies of equal-sized, inelastic spheres. The results of this study have been submitted for publication in Acta Mechanica. Our three-dimensional computer model has also been extended to include frictional interactions between spherical particles. A calculational series is underway examining the effects of interparticulate friction and rotations on the stresses in steady shearing flows. New post processing routines have also been written that provide the capability of making multi-color three-dimensional perspective-projection motion pictures of the granular flow calculations. We report below the highlights of the work performed during this first quarter of FY 1986. DOE

N86-26023# Naval Research Lab., Washington, D. C.
SOFTWARE TECHNOLOGY FOR ADAPTABLE RELIABLE SYSTEMS (STARS) WORKSHOP
1985 960 p refs Workshop held at Washington, D.C., 9-12 Apr. 1985
(AD-A163463; AD-E401440) Avail: NTIS HC A99/MF E03 CSCL 09/2

The Software Technology for Adaptable Reliable Systems (STARS) Project of the Office of the Secretary of Defense seeks sources of information and expertise in the building of mission critical applications software. Component specification, building, testing, maintaining and reutilization are of interest. With the promulgation of Ada as a single High Order Language to build future applications with the three services, there exist new opportunities for reuse of software. Reuse can reduce software system development time and maintenance costs, and improve reliability. This workshop deals with these issues: (1) Parts Taxonomy/Requirements; (2) Incentives; (3) Library; (4) System/Design/Integration with Reusable Parts; and (5) Metrics. GRA

N86-26024# Naval Postgraduate School, Monterey, Calif.
THE OZDRAW USER'S MANUAL AD-A163633 NPS52-86-005 HC A05/MF A01
Steven Firth and Michael J. Zyda Jan. 1986 97 p
(AD-A163633; NPS-52-86-005) Avail: NTIS HC A05/MF A01 CSCL 09/2

OZDRAW is an interactive figure generation system designed to operate on the IRIS 2400 workstations. The aim of OZDRAW is to provide a powerful, yet friendly, general purpose figure generation system to allow untrained users to produce high quality figures that can be used for presentations, technical papers and academic thesis. OZDRAW has been designed so that the user can efficiently operate the system with little or no experience. The system uses pop-up menus to provide the user with the available instructions; menus use text rather than icons to provide an interface that is less ambiguous to the inexperienced user. The system requirements for OZDRAW are: (1) an IRIS 2400 workstation, ideally with three megabytes of memory and a floating-point accelerator, and (2) the IRIS mouse (3) a graphics printer capable of quality graphics production; a laser printer is the preferred printer. GRA

N86-26025# Mitre Corp., Bedford, Mass.
SOFTWARE REPORTING METRICS, REVISION 2 Final Report
R. J. Coles, J. A. Kasputys, K. L. Lasko, T. F. Saunders, and H. P. Schultz Nov. 1985 58 p refs
(Contract F19628-86-C-0001)
(AD-A163756; MTR-9650-Rev-2; ESD-TR-85-14-Rev-2) Avail: NTIS HC A04/MF A01 CSCL 09/2

This paper presents a set of software management metrics that have been developed by the ESD/MITRE Software Center. The metrics are designed to assist in monitoring the progress of software development by gaining better visibility into the software acquisition process. This revision reflects government and industry comments on the previous version, and includes new charts, information on application of the metrics, and appendices containing generic and sample data items. This document is intended to help Project Managers prepare software development status reports. System Program Officers (SPOs) are expected to use these metrics to augment conventional acquisition system development reports such as cost and schedule reports. Section 2 presents each metric. Section 3 discusses application of the metrics. Section 4 describes continuing work efforts in the area of software status monitoring and metrics. GRA

N86-26026# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A CONTEXTUAL POSTPROCESSING EXPERT SYSTEM FOR ENGLISH SENTENCE READING MACHINES M.S. Thesis
David V. Paciorkowski Dec. 1985 140 p refs
(AD-A163951; AFIT/GE/ENG/85D-31) Avail: NTIS HC A07/MF A01 CSCL 09/2

Knowledge-based programming techniques are used in an expert system to reduce uncertainty for optical character recognition by combing evidence from several diverse knowledge sources cooperating in an hierarchical configuration. The postprocessor development focused on a system for generic text input that is not confined to a fixed vocabulary or particular subject domain. The key element to the system's effectiveness is a spell checking algorithm that is not operationally bounded by an enumerated lexicon or biased by statistical sampling. The postprocessor system is also designed to interface almost any type OCR front-end methodology. GRA

N86-26027# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
INTERACTIVE COMPUTER GRAPHICS FOR ANALYSIS AND DESIGN OF CONTROL SYSTEMS M.S. Thesis
John R. Bullard Dec. 1985 257 p refs
(AD-A163952; AFIT/GE/EE/85D-5) Avail: NTIS HC A12/MF A01 CSCL 09/2

The work of improving and adding to the iterative graphics control package called ICECAP (Interactive Control Engineering Computer Analysis Package) is continued. The main emphasis will be on providing a graphical way of entering the desired system's characteristics into ICECAP versus entering the desired system's open-looped transfer function through the keyboard. This will allow the control engineer the ability to graphically place the desired system's poles and zeros through the use of the cursor control keys of the keyboard. In addition, the option of displaying the locus solution, for the entered OLTF, will be available to the user, with the added capability to add and delete new poles and zeros without deleting the previous computed locus solution. In control engineering, one of the engineer's goals is to control a system. A system is an interconnection of components forming a system configuration which will provide a desired system response. The system to be controlled may be chemical, electrical, or mechanical. But in order to accurately determine the resulting output of a control system, it requires that the control engineer model this system in the most accurate way possible. GRA

N86-26028# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
EFFECTS OF RANDOM PHASE SHIFTS AND CARRIER DRIFT ON THE RESOLUTION PROPERTIES OF LINEAR STEP FREQUENCY PULSE TRAINS M.S. Thesis
Thomas L. Griffin, Jr. Dec. 1985 169 p refs
(AD-A163953; AFIT/GE/ENG/85D-19) Avail: NTIS HC A08/MF A01 CSCL 09/4

A FORTRAN program using fast Fourier transforms has been written to calculate and plot the ambiguity function of a uniform linear step frequency pulse train with random initial phases and carrier frequency drifts. The effects of random phases and frequency drifts are studied in two stages. First, the initial phases are allowed to assume any value with equal probability in ranges of 0 to 20 degrees and 0 to 180 degrees while the frequency drifts are zero. Secondly, the phases are fixed at zero and carrier frequency drifts up to 0.1% and 1.0% are set. In each case, the ambiguity surface is shifted along the Doppler axis with the effect being more pronounced for carrier frequency drifts. The effects on the half power width of the central lobe for 10 test cases for each phase and frequency range appear negligible for a two pulse train. Author (GRA)

N86-26029# Lawrence Livermore National Lab., Calif.
INTELLIGENT GATEWAY PROCESSORS AS INTEGRATORS OF CAD/CAM NETWORKS
Viktor E. Hampel, Bruce L. Garner, and Jack R. Matthews 16 Apr. 1986 26 p
(Contract W-7405-eng-48)
(AD-A163036; UCRL-93115) Avail: NTIS HC A03/MF A01 CSCL 09/2

The integration of dissimilar CAD/CAM hardware and software on local and geographically distributed networks is the major problem faced by large organizations today. The authors begin by examining the existing system for storage, retrieval, control, and distribution of design information at Lawrence Livermore National Laboratory and describe a new prototype Engineering Information System (EIS). They then discuss the Department of Energy Neutral Data Exchange Format (DOE/DEP) for the sharing of mechanical drawings among DOE Installations. Finally, they describe the potential role of the Intelligent Gateway Processor (IGP) as a transaction controller for engineering

resources among contractors of the Air Force Logistics Command. IGP capabilities include a unique interpreter driven user interface which permits the installation and modification of resources and the translation of dissimilar data formats, commands, and protocols, in a unified manner while running non-stop. GRA

N86-26030# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DEVELOPMENT AND EVALUATION OF MATH LIBRARY ROUTINES FOR A 1750A AIRBORNE MICROCOMPUTER M.S. Thesis
Jennifer J. Fried 4 Dec. 1985 150 p refs
(AD-A164050; AFIT/GCS/MA/85D-3) Avail: NTIS HC A07/MF A01 CSCL 09/2

This project produced a run-time math library for the MIL-STD-1750A embedded computer architectures. The math library consists of the algebraic functions. In addition, the steps required for a performance analysis of the math library have been outlined. Several approximation methods were investigated. The Chebyshev Economization of Maclaurin series polynomials, and rational approximations derived from the second algorithm of Remes were determined to be the best methods available. Each function's implementation was designed to take advantage of features MIL-STD-1750A architectures. The recommended test procedures provide measures of the average and worst case generated errors within each approximation. Author (GRA)

N86-26031# Texas Univ., Austin. Dept. of Computer Sciences.
HIGH PERFORMANCE PARALLEL COMPUTING Final Report, 1 Jan. - 31 Dec. 1983
James C. Browne, G. J. Lipovski, and M. Malek Dec. 1985 59 p refs
(Contract F49620-83-C-0049)
(AD-A164059; AFOSR-85-1260TR) Avail: NTIS HC A04/MF A01 CSCL 09/2

The accomplishments of the research project High Performance Parallel Computing' for the year 1983 span algorithm formulation, parallel programming languages, basic software for the Texas Reconfigurable Array Computer and validation of design concepts for the Texas Reconfigurable Array Computer (TRAC). Image processing, sorting and time dependent partial differential equations were subjects for algorithm formulation and analysis. Accomplishments in parallel programming include: substantial progress toward the implementation of two parallel programming environments, the Computation Structures Language, and a task level data flow programming system. The hardware prototype of TRAC made substantial progress towards stability. The state-of-the-art in reconfigurable switch based architectures has been advanced. A result of note is the demonstration of the integration of circuit switching and packet switching in a single interconnection network. GRA

N86-26032# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A PROGRAMMER'S ASSISTANT FOR A SPECIAL-PURPOSE DATAFLOW LANGUAGE M.S. Thesis
Alan J. Black Dec. 1985 175 p refs
(AD-A164122; AFIT/GCS/ENG/85D-2) Avail: NTIS HC A08/MF A01 CSCL 09/2

A programming tool, the Graph Design Assistant (GDA), for a special-purpose dataflow language was designed and implemented. The motivation for the effort was the need to construct a robot simulation facility which will assist in the development of effective algorithms to plan and control robot movements. An Evans and Sutherland PS300 graphic workstation is used to display animated robot simulations. The Graph Design Assistant was developed so that researchers could program robot simulations on the PS300 without having to learn the intricacies of the PS300's dataflow language. The Graph Design Assistant was implemented on a Lisp machine using a knowledge engineering tool. The result of the effort was a prototype system to be used as the basis for further development. GRA

N86-26033# Naval Postgraduate School, Monterey, Calif.
2-D SIGNAL GENERATION USING STATE-SPACE FORMULATION M.S. Thesis
Evangelos Theofilou Dec. 1985 171 p refs
(AD-A164128) Avail: NTIS HC A08/MF A01 CSCL 09/2

This thesis considers various approaches to modelling 2-D data fields using state-space formulations. Computer simulation of these models has been carried out to generate simulated 2-D data which could then be used for various other signal processing operations. An interesting development that has resulted from this study is that of adaptation of the 1-D SSPACK software package for simulating 2-D linear systems as well as using one of the above state-variable models. Author (GRA)

N86-26034# California Univ., Berkeley. Operations Research Center.
EXTENSIONS TO POLYCHAIN: NONSEPARABILITY TESTING AND FACTORING ALGORITHM
Lucia I. P. Resende 2 Dec. 1985 40 p refs
(Contract N00014-85-K-0384)
(AD-A164242; ORC-85-14) Avail: NTIS HC A03/MF A01 CSCL 09/2

PolyChain is a portable FORTRAN program for evaluating the reliability of a K-terminal network via polygon-to-chain reductions and the factoring algorithm. The first version of PolyChain allows the evaluation of the K-terminal reliability for series-parallel graphs. The algorithm implemented is a linear time algorithm introduced in 1982 by Satyanarayana and Wood. This report discusses the design and implementation of two features recommended in a previous document that enable PolyChain subroutines to treat a larger class of problems. The algorithm of Satyanarayana and Wood has a constraint on the topology of the input network, requiring it to be nonseparable. The original version of PolyChain does not test for this requirement. One of the features added to PolyChain discussed in this report is the implementation of a routine to check for this condition. The algorithm of Satyanarayana and Wood computes the reliability of a network with an underlying series-parallel structure. When the input network is not totally reducible an extension to the algorithm is required to obtain the reduced network. The second feature discussed in this report is the implementation of a factoring algorithm incorporated to PolyChain to insure the evaluation of the K-terminal network reliability for both series-parallel reducible and irreducible networks. GRA

N86-26035# Stanford Univ., Calif. Center for Reliable Computing.
THE MEASUREMENT AND STATISTICAL MODELING OF COMPUTER RELIABILITY Final Report, 1 Apr. 1982 - 30 Sep. 1985
Edward J. McCluskey and Dorothy M. Andrews Nov. 1985 28 p refs
(Contract DAAG29-82-K-0105)
(AD-A164249; ARO-18690.19-EL) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report describes the research performed during a three year study of computer reliability as affected by system activity. Data collected over an eight year period on three generations of computers was analyzed to determine what relationships exist between failures and activity. The activity included type of utilization, as well as amount of activity (or load) on the computer at time of failure. The failures included both software and hardware (transient, intermittent, and permanent). Another aspect of the research was an evaluation of the fault tolerance provided by the computer system as indicated by software error detection and recovery rates. A third major area of research was the development of a methodology for analysis of failure prediction data. GRA

N86-26036# Advanced Information and Decision Systems, Mountain View, Calif.
FORMALIZATION OF THE PROGRAM REFERENCE LANGUAGE Final Report, 15 Jul. 1984 - 14 Sep. 1985
William M. Bricken, Susan G. Rosenbaum, Michael A. Brzustowicz,

Jeffrey S. Dean, and Brian P. McCune 8 Oct. 1985 84 p refs (Contract F49620-84-C-0075)
(AD-A164265; AI/DS-TR-1066-01; AFOSR-85-1219TR) Avail: NTIS HC A05/MF A01 CSCL 09/2

The goal of the Program Reference Language (PRL) Project is to construct a representation of Ada programs that facilitates retrieval of code based on both syntactic (literal) and semantic (functional) queries. The fourth year of the project focused on the formalization of the Extended Program Model (EPM), which consists of textual, syntactic, and semantic representations. The PRL query language specifies search over these three interrelated databases. Textual items are retrieved by string-matching capabilities of standard editors; syntactic queries are directd to the syntax parse tree; queries referencing program functionality are mapped onto the LOSP semantic representation. GRA

N86-26037# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE DESIGN OF A STANDARD SOFTWARE DEVELOPMENT METHODOLOGY FOR THE BRAZILIAN AERONAUTICAL MINISTRY M.S. Thesis
Aparecido F. de Oliveira Dec. 1985 207 p refs
(AD-A164289; AFIT/GCS/ENG/85D-13) Avail: NTIS HC A10/MF A01 CSCL 09/2

The project matched the requirements of the Brazilian Aeronautical Ministry with the software life cycle models, methods, and techniques, which are currently available and most widely utilized. Based on the analysis, a waterfall model was selected and integrated with some methods, tools, and techniques, such as Gane's method, SADT, Data Dictionary, etc. All of these recommendations were included in a proposed regulation for a software development methodology. GRA

N86-26038# Autometric Corp., Inc., Rome, N.Y.
AUTOMATIC FEATURE EXTRACTION/ALGORITHM TESTING Final Evaluation Report, 28 Sep. 1984 - 30 Sep. 1985
Ned A. Ferris Nov. 1985 24 p refs
(Contract DACA72-84-C-0008)
(AD-A164325; ETL-0410) Avail: NTIS HC A02/MF A01 CSCL 14/5

Feature extraction results using an Improved Texture Clustering Algorithm were compared to photo interpreters' manual segmentation/classification results. The clustering algorithm segments digital images via texture and edge attributes. The probability of detecting a target or feature is increased if the number of segments is reduced; therefore, the algorithm merges segments via edge thresholds. Evaluation showed general agreement, but the edge attributes would apply more to target detection than to feature classification. Author (GRA)

N86-26039# Defence Research Establishment Suffield, Ralston (Alberta).
PLOT: A BASIC PLOTTING ROUTINE FOR THE TEKTRONIX 4054 TERMINAL AND 4663 PLOTTER
M. D. Gauthier-Mayer Nov. 1985 86 p refs
(AD-A164327; DRES-SP-97) Avail: NTIS HC A05/MF A01 CSCL 09/2

A BASIC plotting routine for the Tektronix 4054 terminal and 4663 plotter has been developed. It is named PLOT. The program is capable of plotting in a variety of coordinate systems Cartesian, semilog on X, semilog on Y or log-log. Two separate Y axes can be used. The user can input the axes boundaries, axes titles, the block of data to be plotted, legends for the data, and a figure caption. Model equations can be represented by dashed lines on the plot. The program will accommodate up to 70 data sets, and a total of six data columns. The data can be manipulated by changing data points or sets, adding sets and columns, deleting sets or columns, sorting data in a column, generating columns from existing data and adding two data files together. This report is a working manual for the PLOT program. Author (GRA)

N86-26040# Colorado Univ., Boulder. Dept. of Computer Science.
A STABLE AND EFFICIENT ALGORITHM FOR NONLINEAR ORTHOGONAL DISTANCE REGRESSION
Paul T. Boggs, Richard H. Byrd, and Robert B. Schnabel Dec. 1985 46 p
(Contract DAAG29-81-K-0108; Grant NSF DCR-84-03483)
(AD-A164346; CU-CS-317-85; ARO-18197.8-MA) Avail: NTIS HC A03/MF A01 CSCL 12/1

One of the most widely used methodologies in scientific and engineering research is the fitting of equations to data by least squares. In cases where significant observation errors exist in all data (independent) variables, however, the ordinary least squares approach, where all errors are attributed to the observation (dependent) variable, is often inappropriate. An alternate approach, suggested by several researchers, involves minimizing the sum of squared orthogonal distances between each data point and the curve described by the model equation. We refer to this as orthogonal distance regression (ODR). This paper describes a method for solving the orthogonal distance regression problem that is a direct analog of the trust region Levenberg-Marquardt algorithm. The number of unknowns involved is the number of model parameters plus the number of data points, often a very large number. By exploiting sparsity, however, our algorithm has a computational effort per step which is of the same order as required for the Levenberg-Marquardt method for ordinary least squares. We prove our algorithm to be globally and locally convergent, and perform computational tests that illustrate some differences between the two approaches. Author (GRA)

N86-26041# Connecticut Univ., Storrs. Dept. of Electrical Eng. and Computer Science.
A UNIFIED METHOD FOR DELAY ANALYSIS OF RANDOM MULTIPLE ACCESS ALGORITHMS
L. Georgiadis, L. Merakos, and P. Papantoni-Kazakos Jan. 1986 42 p refs
(Contract N00014-85-K-0547; Grant AF-AFOSR-0229-83)
(AD-A164407; UCT/DEECS/TR-86-1) Avail: NTIS HC A03/MF A01 CSCL 17/2

This paper presents a unified method for the delay analysis of a large class of random multiple-access algorithms. This method is based on a powerful theorem referring to regenerative processes, in conjunction with results from the theory of infinite dimensionality linear systems. The authors apply the method to analyze and compute the per packet expected delays induced by two algorithms, in the presence of the Poisson user model. The considered algorithms are: the controlled ALOHA algorithm, and the 0.487 algorithm. The same method has been previously applied, for the delay analysis of certain limited sensing random access algorithms. Author (GRA)

N86-26042# Naval Postgraduate School, Monterey, Calif.
MULTICHANNEL COLLISION RESOLUTION ALGORITHM M.S. Thesis
Joo H. Cho Dec. 1985 99 p refs
(AD-A164496) Avail: NTIS HC A05/MF A01 CSCL 17/2

A multichannel random accessed communication system was considered. Every time slotted channel is shared by a large number of transmitters. To solve a collision which occurs at a certain time slot, several collision resolution protocols were tested, analyzed, and simulated. The quantities to be investigated in this thesis include L sub N (the average number of slots required to resolve a collision involving users), linear bounding of L sub n and the maximal achievable throughput. GRA

N86-26043# Advanced Decision Systems, Mountain View, Calif.
FORMALIZATION OF THE INTELLIGENT PROGRAM EDITOR Annual Technical Report, 15 Jul. 1984 - 15 Jul. 1985
Susan G. Rosenbaum, William M. Bricken, Michael A. Brzustowicz, and Jeffrey S. Dean Dec. 1985 104 p
(Contract N00014-83-C-0444)
(AD-A163180; TR-1047-02) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report covers the work done during the second year of the Intelligent Program Editor (IPE) project. The research this past

year focused on four major areas. Two of these areas were concerned with the formalization of two aspects of the IPE: the first was the study of the internal representation needs of the Extended Program Model (EPM) database and the development of a formal structure based on predicate logic; the second was on the formalization of the Program Reference Language (PRL) Picture Language to provide a direct mapping between the Picture Language and predicate logic. Another major research area was in the study of efficient retrieval of query requests from the EPM. The final area of work was in the development of an automatic parsing of Ada programs with subsequent textual and syntactic linking and display on the Symbolics LISP machine. Author (GRA)

N86-26044# Yale Univ., New Haven, Conn. Dept. of Computer Science.

HOW TO EMBED TREES IN HYPERCUBES

Sandeep N. Bhatt and Ilse C. F. Ipsen Dec. 1985 10 p
(Contracts N00014-82-K-0184; N00014-85-K-0461)
(AD-A163186; YALEU/DCS/RR-443) Avail: NTIS HC A02/MF A01 CSCL 09/2

Many parallel machines based on the interconnections of the boolean hypercube are now commercially available. A distinctive feature of the hypercube is its universality-computer programs written for simpler architectures, such as grids for example, can be transported onto the hypercube with minimal overhead. These simulations are typically obtained by embedding the simpler architecture within the hypercube. This paper presents efficient embeddings of binary trees in the hypercube. It provides a novel and optimal embedding of a complete binary tree in which all but one tree edges are mapped onto adjacent processors on the hypercube, and the remaining edge is routed through an unused processor. With suitably designed processors and protocols, communication through the forwarding processor should incur no extra delay. The author also presents efficient embeddings of binary trees that are not complete, and shows that any N-node binary tree can be embedded with edges of length log log $N+0(1)$ in a hypercube with no more than 2N processors. The results extend to graphs with small separators. Author (GRA)

N86-26045# Yale Univ., New Haven, Conn. Dept. of Computer Science.

THE IMPACT OF PARALLEL ARCHITECTURES ON THE SOLUTION OF EIGENVALUE PROBLEMS

Ilse C. F. Ipsen and Youcef Saad Dec. 1985 15 p
(Contracts N00014-82-K-0184; N00014-85-K-0461)
(AD-A163187; YALEU/DCS/RR-444) Avail: NTIS HC A02/MF A01 CSCL 12/1

The most significant impact on research in Scientific Computation, and Numerical Linear Algebra in particular, seems to have been brought about by the advent of vector and parallel computation. This paper presents a short survey of recent work on parallel implementations of Numerical Linear Algebra algorithms with emphasis on those relating to the solution of the symmetric eigenvalue problem on loosely coupled multiprocessor architectures. A simple model will be given to analyze the complexity of parallel algorithms on several representative multiprocessor systems: a linear processor array (or ring), a two-dimensional processor grid and the hypercube. The vital operations in the formulation of most eigenvalue algorithms are matrix vector multiplication, matrix transposition, and linear system solution. Their implementations on the above architectures will be described, as well as parallel implementations of the following classes of eigenvalue methods: QR, bisection, divide-and-conquer, and Lanczos algorithm. GRA

N86-26046# Naval Research Lab., Washington, D. C.

ACTIVE DESIGN REVIEWS: PRINCIPLES AND PRACTICES Interim Report, 1982 - 1985

David L. Parnas and David M. Weiss 18 Nov. 1985 14 p
(AD-A163188; NRL-8927) Avail: NTIS HC A02/MF A01 CSCL 09/2

Although many new software design techniques have emerged in the past 15 years, there have been few changes to the procedures for reviewing the designs produced using these techniques. This report describes an improved technique, based on the following ideas, for reviewing designs: The efforts of each reviewer should be focused on those aspects of the design that suit his or her experience and expertise; the characteristics of the reviewers needed should be explicitly specified before reviewers are selected; reviewers should be asked to make positive assertions about the design rather than simply allowed to point out defects; the designers pose questions to the reviewers, rather than vice versa, these questions are posed on a set of questionnaires that requires careful study of aspect of the design; and interaction between designers and reviewers occurs in small meetings involving two to four people rather than meetings of large groups. GRA

N86-26047# Illinois Univ., Urbana. Coordinated Science Lab.

HIGHLY CONCURRENT SCALAR PROCESSING Ph.D. Thesis

Peter Y. Hsu Jan. 1986 122 p
(Contracts N00014-84-C-0149; N00039-80-C-0556)
(AD-A163195; UILU-ENG-86-2203; CSG-49) Avail: NTIS HC A06/MF A01 CSCL 09/2

High speed scalar processing is an essential characteristic of high performance general purpose computer systems. Efficient concurrent execution of scalar code is difficult due to data dependencies and conditional branches. This thesis proposes a code scheduling heuristic call the decision tree scheduling (DTS) technique for general scalar code, and an optimal code scheduling algorithm called the simple loop scheduling (SLS) algorithm for a restricted class of innermost loops. Also proposed is a highly concurrent machine architecture that takes advantage of these scheduling techniques. GRA

N86-26048# Los Alamos National Lab., N. Mex.

ALTERNATIVES TO FORTRAN IN CONTROL SYSTEMS

J. A. Howell and R. M. Wright 1985 7 p Presented at the 2nd International Workshop on Accelerator Control Systems, Los Alamos, N. Mex., 7 Oct. 1985
(Contract W-7503-eng-36)
(DE86-002390; LA-UR-85-3518; CONF-8510194-3) Avail: NTIS HC A02/MF A01

Control system software has traditionally been written in assembly language, FORTRAN, or Basic. Today there exist several high-level languages with features that make them convenient and effective in control systems. These features include bit manipulation, user-defined data types, character manipulation, and high-level logical operations. Some of these languages are quite different from FORTRAN and yet are easy to read and use. We discuss several languages, their features that make them convenient for control systems, and give examples of their use. We focus particular attention on the language C, developed by Bell Laboratories. DOE

N86-26049# Fermi National Accelerator Lab., Batavia, Ill.

STATUS OF FASTBUS SOFTWARE IN THE COMPUTING DEPARTMENT AT FERMILAB

A. Cohen, S. Gannon, and R. Pordes Oct. 1985 5 p Presented at the CERN FASTBUS Software Workshop, Geneva, Switzerland, 23 Sep. 1985
(Contract DE-AC02-76CH-03000)
(DE86-002544; FNAL-TM-1359; CONF-8509189-1) Avail: NTIS HC A02/MF A01

This paper presents the current status of FASTBUS software projects in the Data Acquisition Group at Fermilab. The Computing Department, which includes this group, supports software running under the PDF-11 RT-11, RSX and VAX/VMS operating systems. FORTRAN callable subroutine libraries are available to access FASTBUS through the IORFI-II, UNIBUS Processor Interface (UPI) and Lecroy 1821 Host Interface. The PASTBUS Diagnostic Language, implemented and supported at the University of Illinois, is used at Fermilab, where it has been converted to run under the VAX/VMS and RSX-11M operating systems. A first version of a FASTBUS database has been implemented with and

provides data to a program which automatically generates logical addresses. DOE

N86-26050# Fermi National Accelerator Lab., Batavia, Ill.
CDC FIELD MAPPING DEVICE: ROTOTRACK
R. Yamada, J. Hawtree, K. Kaczar, R. Leverence, K. McGuire, C. Newman-Holmes, E. E. Schmidt, and J. Shallenberger Oct. 1985 22 p
(Contract DE-AC02-76CH-03000)
(DE86-00254; FNAL-TM-1358) Avail: NTIS HC A02/MF A01

A field mapping device for the magnet of the Collider Detector at Fermilab (CDF) was constructed. The device was used for the extensive study of the CDF magnetic field distribution. The mechanical and electrical features of the device, as well as the data acquisition system and software, are described. The mechanical system was designed so that the errors on the position and angle of the problem were + or - 0.75 mm and + or - 1 mrad, respectively. DOE

N86-26051# Oak Ridge National Lab., Tenn.
EZPLOT: FORTRAN GRAPHICS ROUTINES FOR THE IBM PC
M. R. Patterson and E. C. Long Dec. 1985 28 p refs
(Contract DE-AC05-84OR-21400)
(DE86-004598; ORNL/CSD-129) Avail: NTIS HC A03/MF A01

A set of FORTRAN plotting routines called EZPLOT is described in this report. EZPLOT simulates a subset of the DISSPLA calls to make plots on the IBM PC screen and an attached printer, using terminal emulators called PCPLOT and TEK. More than thirty DISSPLA calls are simulated by the EZPLOT routines. Typical screen plots require about five minutes, including compilation and linking; hard copy of the screen image requires another minute; and high resolution hardcopy requires an additional seven minutes. These routines give the IBM PC user a stand-alone capability to make useful scientific or engineering plots using data generated in FORTRAN programs. DOE

N86-26052# California State Univ., Hayward.
NEW IDEAS FOR PARALLEL ALGORITHMS ON VECTOR- AND MULTI-PROCESSORS
E. Reiter, G. Rodrique, and D. Wolitzer Oct. 1985 17 p Presented at the Parallel Computing Conference, West Berlin, Germany, 23 Sep. 1985 Prepared in cooperation with Lawrence Livermore National Lab., Calif.
(Contract W-7405-eng-48)
(DE86-002989; UCRL-93564; CONF-8509200-1) Avail: NTIS HC A02/MF A01

Parallel numerical algorithms are characterized by having within their overall mathematical structure certain well-defined substructures that can be executed simultaneously. These mathematical substructures can be individual arithematic operations such as the addition of two vectors, or mathematical tasks such as the inversion of sequence of matrices. Computers vary on how they carry out these mathematical substructures; however, over the past decade two distinct computer architectural trends have become popular: the vector processor and the multiprocessor. Vector processors can execute parallel mathematical tasks at the floating point operation level. Even more specifically, they can only execute identical floating point operations. Multiprocessors, on the other hand, can execute larger mathematical subtasks. The basic features of the vector and multiprocessor are reviewed. Some ideas on how parallel mathematical substructures can be produced so as to create efficient algorithms for these machines are demonstrated. Computational examples will be given in both cases. DOE

N86-26053# National Center for Atmospheric Research, Boulder, Colo.
UNIX WORD PROCESSING AT HAO (FOR USE WITH THE 4.2 BSD VERSION AND -me MACRO PACKAGE)
N. Dawson Jan. 1986 150 p
(Grant NSF ATM-82-17015)
(PB86-155801; NCAR/TN-263+IA) Avail: NTIS HC A07/MF A01 CSCL 09B

The instructions for word processing on UNIX are scattered over several manuals, and many of the manuals are difficult to understand because of the technical language. The manual is a compilation of the word processing commands you are likely to need while using UNIX at the High Altitude Observatory of the National Center for Atmospheric Research in Boulder, Colorado. The manual is written in plain English and is full of examples. The word processing commands and their printed results make up the major part of the manual, part 2. Part 3 contains sample letters and memos. Part 4 contains some tips on table and equations, the lists of mathematical and Greek characters, UNIX commands that are frequently used with word processing, a brief bibliography, and a vi crib sheet (which contains frequently used editing commands). GRA

62 COMPUTER SYSTEMS

Includes computer networks.

N86-26054# Oak Ridge National Lab., Tenn.
MODELING OF COMPLEX MELTING AND SOLIDIFICATION BEHAVIOR IN LASER-IRRADIATED MATERIALS: A DESCRIPTION AND USERS GUIDE TO THE LASER8 COMPUTER PROGRAM
G. A. Geist and R. F. Wood Nov. 1985 94 p
(Contract DE-AC05-84OR-21400)
(DE86-004661; ORNL-6242) Avail: NTIS HC A05/MF A01

The conceptual foundation of a computational model and a computer program based on it have been developed for treating various aspects of the complex melting and solidification behavior observed in pulsed laser-irradiated materials. A particularly important feature of the modeling is the capability of allowing melting and solidification to occur at temperatures other than the thermodynamic phase change temperatures. As a result, interfacial undercooling and overheating can be introduced and various types of nucleation events can be simulated. Calculations on silicon with the model have shown a wide variety of behavior, including the formation and propagation of multiple phase fronts. Although originally developed as a tool for studying certain problems arising in the field of laser annealing of semiconductors, the program should be useful in treating many types of systems in which phase changes and nucleation phenomena play important roles. The underlying physical and mathematical ideas and the basic relations used in LASER8 are discussed. Enough specific and detailed information on the program to serve as a guide for its use is given. A listing of one version of the program is given. DOE

N86-26055# Argonne National Lab., Ill.
QUASI-AUTOMATIC PARALLELIZATION: A SIMPLIFIED APPROACH TO MULTIPROCESSING
B. W. Glickfeld and R. A. Overbeek Oct. 1985 103 p refs
(Contract W-31-109-eng-38)
(DE86-005120; ANL-85-70) Avail: NTIS HC A06/MF A01

As multiprocessors become commercially available, a great deal of concern is being focused on the problems involved in writing and debugging software for such machines. Earlier work described the use of monitors implemented by macro processors to attain portable code. This work formulates a general-purpose monitor which simplifies the programming of a wide class of numeric algorithms. We believe that the approach of describing a set of schedulable units of computation advocated by Brown offers a real simplification for the applications programmer. In this paper, we propose a straightforward programming paradigm for describing schedulable units of computation that allows the description of many algorithms with very little effort. DOE

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N86-26056*# Drexel Univ., Philadelphia, Pa. Dept. of Mechanical Engineering and Mechanics.

TWO TIME SCALE OUTPUT FEEDBACK REGULATION FOR ILL-CONDITIONED SYSTEMS Final Report, Jan. 1982 - Jun. 1984

Anthony J. Calise and Daniel D. Moerder Washington NASA May 1986 71 p refs
(Grant NAG1-243)
(NASA-CR-3972; NAS 1.26:3972) Avail: NTIS HC A04/MF A01 CSCL 09B

Issues pertaining to the well-posedness of a two time scale approach to the output feedback regulator design problem are examined. An approximate quadratic performance index which reflects a two time scale decomposition of the system dynamics is developed. It is shown that, under mild assumptions, minimization of this cost leads to feedback gains providing a second-order approximation of optimal full system performance. A simplified approach to two time scale feedback design is also developed, in which gains are separately calculated to stabilize the slow and fast subsystem models. By exploiting the notion of combined control and observation spillover suppression, conditions are derived assuring that these gains will stabilize the full-order system. A sequential numerical algorithm is described which obtains output feedback gains minimizing a broad class of performance indices, including the standard LQ case. It is shown that the algorithm converges to a local minimum under nonrestrictive assumptions. This procedure is adapted to and demonstrated for the two time scale design formulations. Author

N86-26057# George Washington Univ., Washington, D.C. Inst. for Reliability and Risk Analysis.

THE CALCULUS OF UNCERTAINTY IN ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS. Final Report, 1 Dec. 1984 - 30 Nov. 1985

N. D. Singpurwalla and Seymour M. Selig 15 Jan. 1986 269 p refs Proc. of conference held on 28-29 Dec. 1984
(Contracts N00014-85-K-0202; N00014-85-G-0162)
(AD-A163642; GWU/IRRA/SERIAL-TR-86/2) Avail: NTIS HC A12/MF A01 CSCL 09/2

Uncertainty in artificial intelligence and expert systems are discussed. Three different approaches were examined, namely: (1) The use of belief functions, (2) fuzzy set logic, and (3) probability. A case study example of a probabilistic approach for expert systems in medicine was presented. GRA

N86-26058# Rancho Crmel Artificial Intelligence Center, San Diego, Calif.

APPLICATION OF SOME NEW ARTIFICIAL NEURAL SYSTEM PROCESSING PRINCIPLES TO PATTERN CLASSIFICATION Interim Technical Report, 26 Aug. - 18 Nov. 1985

Robert Hecht-Nielsen and Carolyn Smith 18 Nov. 1985 12 p refs
(Contract DAAG29-85-C-0025)
(AD-A163780; ARO-22323.1-MA) Avail: NTIS HC A02/MF A01 CSCL 06/4

The overall goal of the Army Research Office (ARO) study is to provide a firm conceptual and theoretical foundation for future work in ANS by exploring the use of three information processing principles. This entails both experimental exploration and theoretical development of design laws that can quantitatively predict system behavior and performance. This interim report describes the pattern environment which will support the planned experimentation. The pattern environment is a simple version of spoken English (called Lenglish), where each letter is associated with an arbitrary sound spectrum and there is a continuous transition between the spectra of adjacent letters. The signal input to the ANS will be the Lenglish reading of selected source texts. The planned experimentation will use a model of unsupervised learning to discover feature detectors for spatiotemporal segments of the input language. GRA

N86-26059# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

AUTONOMOUS VEHICLE MISSION PLANNING USING AI (ARTIFICIAL INTELLIGENCE) TECHNIQUES M.S. Thesis

Samuel E. Stockbridge Dec. 1985 211 p refs
(AD-A163956; AFIT/GE/ENG/85D-45) Avail: NTIS HC A10/MF A01 CSCL 06/4

This thesis investigates a software architecture for autonomous vehicle control. The autonomous vehicle's planning ability is divided into operating system functions and mission planning system functions. The blackboard control architecture is adopted for the operating system design with implementation using the ROSS programming language. The planning system incorporate elements of a planar land understander by declaratively encoding meta-knowledge, or knowledge about the planning process. By separating the knowledge about how to plan from the specific domain knowledge, an understander can use this knowledge about how plans are constructed, in combination with the specific domain knowledge, in the understanding process. Likewise, a planner can use this same knowledge in the planning process. Thus, a great deal of flexibility is strained by dividing the knowledge base into meta-rules and domain specific rules. The planning system constructs an agenda of scripts which directs the control flow in the operating system. The operating system is given the additional duties of goal detector and plan projector and detects any errors in the plan. The implementation demonstrates the benefits of using meta-planning concepts combined with a blackboard control architecture to provide an autonomous vehicle with a more flexible and powerful planning capability. GRA

N86-26060# California Univ., San Diego. Inst. for Congitive Science.

LEARNING INTERNAL REPRESENTATIONS BY ERROR PROPAGATION Technical Report, Mar. - Sep. 1985

David E. Rumelhart, Geoffrey E. Hinton, and Ronald J. Williams Sep. 1985 48 p refs
(Contract N00014-85-K-04507)
(AD-A164453; ICS-8506) Avail: NTIS HC A03/MF A01 CSCL 05/10

This paper presents a generalization of the perception learning procedure for learning the correct sets of connections for arbitrary networks. The rule, called the generalized delta rule, is a simple scheme for implementing a gradient descent method for finding weights that minimize the sum squared error of the system's performance. The major theoretical contribution of the work is the procedure called error propagation, whereby the gradient can be determined by individual units of the network based only on locally available information. The major empirical contribution of the work is to show that the problem of local minima not serious in this application of gradient descent. GRA

N86-26061# Joint Publications Research Service, Arlington, Va.

USSR REPORT: SCIENCE AND TECHNOLOGY POLICY

31 Mar. 1986 74 p refs Transl. into ENGLISH from various Russian articles
(JPRS-UST-86-011) Avail: NTIS HC A04

Progress in USSR science and technology and the implementation of policies are reported. Topics discussed include: organization, planning and coordination, research facilities and manpower and automation and information policies. For individual titles, see N86-26062 through N86-26062.

N86-26062# Joint Publications Research Service, Arlington, Va.

ROLE OF ROBOTICS IN SOLVING PRODUCTION, SOCIAL PROBLEMS

Yevgeniy Pavlovich Popov *In its* USSR Report: Science and Technology Policy (JPRS-UST-86-011) 31 Mar. 1986 p 60-71 refs (For primary document see N86-26061 16-63)
Avail: NTIS HC A04

The implementation of automation and information policies by robotic systems is discussed. The robotic systems are divided into four different groups: (1) manipulation; (2) mobility; (3) information; and (4) control. The use of industrial robots to replace people and also to solve the shortage of human resources is outlined. The use of special instrument complexes in the development of the information part of the control systems of adaptive

robots and their software is outlined. The role of information science in the development of industrial robotics, in general, and in flexible machine systems, in particular, is enumerated. E.A.K.

N86-26156# Joint Publications Research Service, Arlington, Va.
COMPUTERIZATION DEMANDS ADVANCED MATHEMATICAL MODELING Abstract Only
A. A. Samarskiy *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 62-64 Transl. into ENGLISH from NTR: Problemy i Resheniya (Moscow, USSR), no. 5, 16 Jul. - 3 Aug. 1985 p 1; 4-5 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26159# Joint Publications Research Service, Arlington, Va.
PRINCIPLES OF MULTIVARIANT DOMINATION IN OPITMUM CONTROL OF TECHNOLOGICAL PROCESSES Abstract Only
E. M. Aliyev *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 68 Transl. into ENGLISH from Izvestiya Akademii Nauk USSR. Seriya Tekhnicheskikh Nauk (Tashkent, USSR), no. 6, Nov. - Dec. 1984 p 6-10 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26160# Joint Publications Research Service, Arlington, Va.
SIMULATION PROBLEM OF CONTROLLING LATERAL MOVEMENT OF AIRCRAFT DURING LANDING APPROACH Abstract Only
N. D. Botkin, V. M. Keyn, and V. S. Patsko *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 69-70 Transl. into ENGLISH from Prikladnaya Matematika i Mekhanika (Moscow, USSR), v. 48, no. 4, Jul. - Aug. 1984 p 560-567 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N86-26063# Purdue Univ., West Lafayette, Ind. School of Electrical Engineering.
IMPULSE RESPONSE IDENTIFICATION WITH DETERMINISTIC INPUTS USING NON-PARAMETRIC METHODS
U. K. Bhargava, R. L. Kashyap, and D. M. Goodman 15 Oct. 1985 11 p Presented at the 23rd Annual Allerton Conference on Communication, Control and Computing, Urbana-Champaign, Ill., 3-5 Oct. 1985
(Contract W-7405-eng-48)
(DE86-002852; UCRL-93531; CONF-8510226-1) Avail: NTIS HC A02/MF A01

This paper addresses the problem of impulse response identification using nonparametric methods. Although the techniques developed herein apply to the truncated, untruncated, and the circulant models, we focus on the truncated model which is useful in certain applications. Two methods of impulse response identification are presented. The first is based on the minimization of the C/sub L/ Statistic, which is an estimate of the mean square prediction error; the second is a Bayesian approach. For both of these methods, we consider the effects of using both the identity matrix and the Laplacian matrix as weights on the energy in the impulse response. In addition, we present a method for estimating the effective length of the impulse response. Estimating the length is particularly important in the truncated case. Finally, we develop a method for estimating the noise variance at the output. Often, prior information on the noise variance is not available, and a good estimate is crucial to the success of estimating the impulse response with a nonparametric technique. DOE

N86-26064# Washington Univ., Seattle. Dept. of Applied Mathematics.
PERTURBATION TECHNIQUES FOR OSCILLATORY SYSTEMS WITH SLOWLY VARYING COEFFICIENTS
J. Kevorkian 1985 131 p refs
(Contract DE-AT06-83ER-13121)
(DE86-004299; DOE/ER-13121/5) Avail: NTIS HC A07/MF A01

This is an expository paper on perturbation techniques and results for a general system of first order equations that model various weakly nonlinear oscillatory motions with slowly varying parameters. Example problems from three application areas are derived then transformed to a standard form. Asymptotic solutions and adiabatic invariants are calculated using the method of near identity averaging transformations. Equivalent results are also derived using the method of multiple scales. When certain divisors in the solution tend to zero, one can isolate the resonant behavior in a reduced problem of lower order. The solution of this reduced problem is discussed in detail for the case of transient resonance, and qualitatively for the case of sustained resonance. DOE

N86-26065# Oak Ridge National Lab., Tenn.
ANALYTIC CONTINUATION AND GREEN'S FUNCTION CALCULATIONS
L. J. Gray and T. Kaplan Nov. 1985 25 p refs
(Contract DE-AC05-84OR-21400)
(DE86-004669; ORNL-6191) Avail: NTIS HC A02/MF A01

Hass, Velicky, and Ehrenreich have shown that Green's function values can be obtained appreciably faster by performing the calculation at complex energies with large imaginary parts and then coming back to real energies by an analytic continuation algorithm. However, analytic continuation is numerically unstable and thus an error analysis is essential if one is to have confidence in the results of the continuation. Error estimates are obtained for the power series method of Hass, et al., and also for a method based upon Cauchy's Theorem. These estimates can be used to select appropriate values for the parameters of the continuation algorithms and also to determine which of the two methods is most appropriate for a given calculation. DOE

N86-26066# Sandia National Labs., Albuquerque, N. Mex.
RDEAM: AN ADAMS ODE CODE WITH ROOT SOLVING CAPABILITY
H. A. Watts Oct. 1985 64 p refs
(Contract DE-AC04-76DP-00789)
(DE86-004971; SAND-85-1595) Avail: NTIS HC A04/MF A01

Our goal has been to develop a robust root solving ODE code; that is, one which solves differential equations and isolates roots of specified event functions in the solution variables. This work concentrated on computational and software issues aimed at enhancing the reliability of locating the roots in question. Thus the primary emphasis has been placed on providing a capability which has not previously been available, and one which is needed for handling difficult and sensitive root problems. There is no doubt that we are doing a lot of work in attempting to guarantee the finding of all roots, regardless of the problem formulation. This effort is what we have referred to as the refined or sophisticated root searching procedure. It is relatively expensive, but necessary, for some problems. A less expensive and more conventional mode of operation for the root solving is also available to the user. This approach skips the refined root searching so that root detection is based solely on looking for a sign change at the endpoints of the integration step size interval. This will work well provided there is a good correlation between the step sizes taken for the integration problem and the scale or variation of the event functions. Otherwise roots are likely to be missed. DOE

N86-26067*# Kansas Univ. Center for Research, Inc., Lawrence. Structural Engineering and Engineering Materials.
THEORETICAL AND SOFTWARE CONSIDERATIONS FOR GENERAL DYNAMIC ANALYSIS USING MULTILEVEL SUBSTRUCTURED MODELS Final Report
Richard J. Schmidt and Robert H. Dodds, Jr. Sep. 1985 189 p refs
(Grant NAG3-32)
(NASA-CR-176822; NAS 1.26:176822; KU-SM-15) Avail: NTIS

HC A09/MF A01 CSCL 12A

The dynamic analysis of complex structural systems using the finite element method and multilevel substructured models is presented. The fixed-interface method is selected for substructure reduction because of its efficiency, accuracy, and adaptability to restart and reanalysis. This method is extended to reduction of substructures which are themselves composed of reduced substructures. The implementation and performance of the method in a general purpose software system is emphasized. Solution algorithms consistent with the chosen data structures are presented. It is demonstrated that successful finite element software requires the use of software executives to supplement the algorithmic language. The complexity of the implementation of restart and reanalysis porcedures illustrates the need for executive systems to support the noncomputational aspects of the software. It is shown that significant computational efficiencies can be achieved through proper use of substructuring and reduction technbiques without sacrificing solution accuracy. The restart and reanalysis capabilities and the flexible procedures for multilevel substructured modeling gives economical yet accurate analyses of complex structural systems. Author

N86-26068*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A FOURTH ORDER ACCURATE FINITE DIFFERENCE SCHEME FOR THE COMPUTATION OF ELASTIC WAVES Final Report
A. Bayliss, K. E. Jordan, B. J. LeMesurier, and E. Turkel Apr. 1986 44 p refs Submitted for publication
(Contracts NAS1-17070; NAS1-18107)
(NASA-CR-178089; ICASE-86-21; NAS 1.26:178089) Avail: NTIS HC A03/MF A01 CSCL 12A

A finite difference for elastic waves is introduced. The model is based on the first order system of equations for the velocities and stresses. The differencing is fourth order accurate on the spatial derivatives and second order accurate in time. The model is tested on a series of examples including the Lamb problem. scattering from plane interfaces and scattering from a fluid-elastic interface. The scheme is shown to be effective for these problems. The accuracy and stability is insensitive to the Poisson ratio. For the class of problems considered here it is found that the fourth order scheme requires for two-thirds to one-half the resolution of a typical second order scheme to give comparable accuracy.
Author

N86-26069*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRECONDITIONED METHODS FOR SOLVING THE INCOMPRESSIBLE AND LOW SPEED COMPRESSIBLE EQUATIONS Final Report
Eli Turkel Mar. 1986 39 p refs Submitted for publication
(Contracts NAS1-17070; NAS1-18107)
(NASA-CR-178086; ICASE-86-14; NAS 1.26:178086) Avail: NTIS HC A03/MF A01 CSCL 12A

Acceleration methods are presented for solving the steady state incompressible equations. These systems are preconditioned by introducing artificial time derivatives which allow for a faster convergence to the steady state. The compressible equations in conservation form with slow flow are also considered. Two arbitrary functions, alpha and beta, are introduced in the general preconditioning. An analysis of this system is presented and an optimal value for beta is determined given a constant, alpha. It is further shown that the resultant incompressible equations form a symmetric hyperbolic system and so are well posed. Several generalizations to the compressible equations are presented which generalize previous results. Author

N86-26070*# National Aeronautics and Space Administration, Washington, D.C.
QUASI-GENERALIZED VARIABLES
J. Baumgarten and G. P. Ostermeyer May 1986 24 p refs Transl. into ENGLISH from Zeitschrift fuer Angewandte Mathematik und Mechanik (Berlin, West Germany), v. 65, no. 10, 1985 p 471-478 Original language document was announced in IAA as A86-18713 Transl. by The Corporate Word, Inc., Pittsburgh, Pa.
(Contract NASw-4006)
(NASA-TM-88429; NAS 1.15:88429; ISSN-0044-2267) Avail: NTIS HC A02/MF A01 CSCL 12A

The numerical solution of a system of differential and algebraic equations is difficult, due to the appearance of numerical instabilities. A method is presented here which permits numerical solutions of such a system to be obtained which satisfy the algebraic constraint equations exactly without reducing the order of the differential equations. The method is demonstrated using examples from mechanics. Author

N86-26071# Washington Univ., Seattle. Dept. of Statistics.
ORTHOGONAL REGRESSION M-ESTIMATORS Technical Report, 1 Dec. 1984 - 30 Nov. 1985
Ruben H. Zamar Dec. 1985 55 p refs
(Contract N00014-84-C-0169)
(AD-A163515; TR-62) Avail: NTIS HC A04/MF A01 CSCL 12/1

M-estimators in the orthogonal regression set-up are defined in order to produce a robust alternative to the method of classical orthogonal regression. Asymptotic qualitative robustness of some orthogonal M-estimators is proved. The influence curve of these estimators is computed and some additional asymptotic theory is presented. GRA

N86-26072# Advanced Statistical Technologies Corp., Lawrenceville, N.J.
ASYMPTOTIC PROPERTIES OF INDUCED MAXIMUM LIKELIHOOD ESTIMATES OF NONLINEAR MODELS FOR ITEM RESPONSE VARIABLES: THE FINITE-GENERIC-ITEM-POOL CASE Technical Report, 1 Oct. 1984 - 31 Jul. 1985
Douglas H. Jones Oct. 1985 38 p refs
(Contract N00014-83-C-0627)
(AD-A163518; ROB-03-85; TR-01-85-ONR) Avail: NTIS HC A03/MF A01 CSCL 12/1

The progress of modern mental test theory depends very much on the techniques of maximum likelihood estimation, and many popular applications make use of likelihoods induced by logistic item response models. While, in reality, item responses are nonreplicate within a single examinee and the logistic models are only ideal, practitioners make inferences using the asymptotic distribution of the maximum likelihood estimator derived as if item responses were replicated and satisfied their ideal model. This article proposes a sample space acknowledging these two realities and derives the asymptotic distribution of the induced maximum likelihood estimator. This article assumes that items, while sampled from an infinite set of items, have but a finite domain of alternate response functions: this situation is the case of the finite-generic-item-pool. Using the proposed sample space, the article applies the statistical functional approach of von Mises to derive the influence curve of the maximum likelihood estimator; to discuss related robustness properties; and to derive new classes of resistent estimators. The aim is revealing the value of these methods for uncovering the relative merits of different item response functions. Proofs and mathematical derivations are minimized to increase the accessability of this complex subject.
Author (GRA)

N86-26073# Wisconsin Univ., Madison. Mathematics Research Center.
MAXIMUM LIKELIHOOD RECURSION AND STOCHASTIC APPROXIMATION IN SEQUENTIAL DESIGNS Technical Summary Report
C. F. J. Wu Nov. 1985 22 p
(Contract DAAG29-80-C-0041)
(AD-A163628; MRC-TSR-2890) Avail: NTIS HC A02/MF A01 CSCL 12/1

When the saving of sample size is an important consideration, sequential design of experiments is often used. By efficiently utilizing the information in the past experiments, it determines how the next experiment should be conducted. Statistical theory for

sequential designs has been developed for normal and binomial variations. For the problem of determining the solution of an unknown nonlinear equation, we have developed a class of sequential design procedures that can handle very general variations described by the generalized linear models. In special cases it includes a new adaptive version of the Robbins-Monro stochastic approximation and a maximum likelihood recursion scheme for quantal responses. Its relation to the stochastic approximation and the role the link function plays are studied. Theoretical issues such as consistency, robustness, asymptotic normality and second-order properties are discussed. GRA

N86-26074# Stevens Inst. of Tech., Hoboken, N. J. Dept. of Mechanical Engineering.

TIME DOMAIN DESIGN OF ROBUST CONTROLLERS FOR LQG (LINEAR QUADRATIC GAUSSIAN); APPLICATION TO LARGE SPACE STRUCTURES Final Report, May 1984 - Aug. 1985

Rama K. Yedavalli Dec. 1985 104 p
(Contract F33615-84-K-3606)
(AD-A163635; AFWAL-TR-85-3093) Avail: NTIS HC A06/MF A01 CSCL 20/11

The aspect of Robustness for linear multivariable systems in time domain is the central theme of the research under the present contract. Upper bonds on the linear, structured, time varying perturbation of an asymptotically stable linear time invariant regulator are obtained to maintain both stability and acceptable regulation, using Lyapunov approach. Improvement of the proposed measures over existing measures is illustrated with the help of examples. It is shown that by employing a scaling transformation on the nominal system, it is possible to further improve the upper bound. The proposed Perturbation Round Analysis is used to design robust controllers for Linear Quadratic Regulators with structured uncertainity. Introducing quantitative measures called Stability Robustness Index and Performance Robustness Index, design algorithms are presented by which one can achieve a trade off between nominal performance, stability robustness and performance robustness. Applications considered include aircraft control problems, large space structure control problems having uncertain modal data and mode truncation as the perturbations. GRA

N86-26075# Wisconsin Univ., Madison. Mathematics Research Center.

THE CLASSIFICATION OF SOLUTIONS OF QUADRATIC RIEMANN PROBLEMS (2) Technical Summary Report

E. Isaacson and B. Temple Dec. 1985 35 p
(Contracts DAAG29-80-C-0041; DE-AC02-76ER-03077)
(AD-A163651; MRC-TSR-2892) Avail: NTIS HC A03/MF A01 CSCL 12/1

This is one step in a program aimed at classifying solutions of the Riemann problem for 2 x 2 systems of hyperbolic quadratic conservation laws. This system consists of partial differential equations. Such conservation laws approximate a general 2 x 2 system of conservation laws in a neighborhood of a point at which strict hyperbolicity fails. The solution for the symmetric systems in Region III of the four region classification of Schaeffer and Shearer is given. The solution is based on the qualitative shape of the integral curves described by Schaeffer and Shearer and a numerical calculation of the Hugonoit loci with their shock types. Author (GRA)

N86-26076# Wisconsin Univ., Madison. Mathematics Research Center.

B-SPLINES WITHOUT DIVIDED DIFFERENCES Technical Summary Report

Carl deBoor and Klaus Hoellig Dec. 1985 12 p refs
(Contract DAAG29-80-C-0041; Grant NSF DMS-83-51187)
(AD-A163702; MRC-TSR-2896) Avail: NTIS HC A02/MF A01 CSCL 12/1

This note develops the basic B-spline theory without using divided differences. Instead, the starting point is the definition of B-splines via recurrence relations. This approach yields very simple derivations of basic properties of spline functions and algorithms. GRA

N86-26077# Wisconsin Univ., Madison. Mathematics Research Center.

THE CLASSIFICATION OF SOLUTIONS OF QUADRATIC RIEMANN PROBLEMS (1) Technical Summary Report

E. Isaacson (Wyoming Univ., Laramie), D. Marchesin (Pontifica Univ. Catolica do Rio de Janeiro, Brazil), B. Plohr, and B. Temple Dec. 1985 55 p Sponsored in part by FINEP/Brazil grant, CNPq grants and Wyoming Univ.
(Contracts DAAG29-80-C-0041; DE-AC02-76ER-03077; Grants NSF DMS-83-1229; NSF INT-84-15209; NSF DMS-82-10950; AF-AFOSR-0117-85)
(AD-A163706; MRC-TSR-2891) Avail: NTIS HC A04/MF A01 CSCL 12/1

We are interested in classifying the solutions of Riemann problems for the 2 x 2 conservation laws which have homogeneous quadratic flux functions. Such flux functions approximate an arbitrary 2 x 2 system in a neighborhood of an isolated point where strict hyperbolicity fails. This problem was motivated by Marchesin and Paes-Leme who discovered such a singularity in a system of equations arising in oil reservoir simulation. Schaeffer, Shearer, Marchesin and Paes-Leme solved the Riemann problem for this system in a neighborhood of the singular point. Isaacson and Temple outlined a program for classifying such singularities by means of locating normal forms for the equivalence classes of equations generated by linear changes in dependent variables. A 2-parameter family of such normal forms were found by Plohr. In the important work of Schaeffer and Shearer a new normal form was found which reduced the classification of integral curves to a theorem of Darboux on the classification of umbilic points for homogeneous cubic equations. The integral curves fall into four isomorphism classes, called Regions 1-4. In this paper we give the solution of the Riemann problem for the systems in Region 4 which exhibit up-down symmetry. GRA

N86-26078# California Univ., Berkeley. Operations Research Center.

THE GROUP CONSENSUS PROBLEM

Kiduck Chang Dec. 1985 49 p refs
(Contract N00014-85-K-0384; Grant AF-AFOSR-0122-81)
(AD-A164064; ORC-85-13) Avail: NTIS HC A03/MF A01 CSCL 12/1

In a group consensus problem, there is a group with K greater than or equal to 2 members who are jointly responsible for the aggregation of their opinions. The group may not have a predefined real decision problem. French called the group consensus problem with a predefined real decision problem a group decision problem and the group consensus problem without a real decision problem a text-book problem. Suppose a group with K members are interested in forecasting demands for a commodity for a given time period. Production planning for this commodity depends on demands. Each group member may have his own opinion for demands in the form of probability distribution. In this case the group has a real decision problem in which they should determine the amount of the commodity to be produced. Here the group consensus opinion is a probability distribution for demands obtained from the group members' prior opinions for demands. For example a group of meteorologists are required to give a single forecast for weather without having any real decision problem. This is an example of the text-book problem. Savage suggested that the whole of statistical theory is directly or indirectly aimed at the solution of a version of the text-book problem. The objective of this paper is to give a unified approach for these two problems. In this paper all the group members are assumed to be Bayesians. GRA

N86-26079# Florida State Univ., Tallahassee. Dept. of Statistics.

THE METHOD OF SIEVES. A SURVEY OF RECENT APPLICATIONS

Ian W. McKeague Dec. 1985 12 p refs
(Contract DAAG29-82-K-0168)
(AD-A164087; FSU-Statistics-M718; TR-D-84-ARO; ARO-19367.34-MA) Avail: NTIS HC A02/MF A01 CSCL 12/1

The method of sieves is a technique of nonparametric estimation in which estimators are restricted by an increasing sequence of subsets of the parameter space with the subsets indexed by the sample size. The need for this technique arises in situations where the parameter space is too large for the existence or consistency of unconstrained maximum likelihood or least squares estimators. Grenander developed the abstract theory of the method of sieves and provided a wealth of examples illustrating its use. This article is to appear under the entry SIEVES, METHOD OF in the Encylopedia of Statistical Sciences. GRA

N86-26080# Maryland Univ., College Park. Inst. for Physical Science and Technology.
THE FACTORIZATION METHOD FOR THE NUMERICAL SOLUTION OF TWO POINT BOUNDARY VALUE PROBLEMS FOR LINEAR ODE'S (ORDINARY DIFFERENTIAL EQUATIONS) Final Note
I. Babuska and V. Majer Jan. 1986 79 p refs
(Contract N00014-85-K-0169; Grant NSF DMS-83-15216)
(AD-A164368; BN-1039) Avail: NTIS HC A05/MF A01 CSCL 12/1

The theoretical analysis and computational implementation of factorization-based methods for the numerical solution of linear boundary value problems for ordinary differential equations are presented. The methods are optimal with respect to certain clearly defined criteria. Numerical examples show the effectiveness of a general code based on the factorization method. Direct methods are characterized by the solution of global (linear) algebraic systems for the discrete solution. In this sense multi-shooting may be regarded as a hybrid method between the two classes. A sophisticated recent example of multi-shooting is the BOUNDPAC package. Indirect solution methods are characterized by the association of the boundary value problem with certain auxiliary initial value problems (IVP). The auxiliary IVP's are generally solved uni-directionally (forward), but a subclass of initial value based methods are based on bi-directional (double sweep) strategies. GRA

N86-26081# Naval Research Lab., Washington, D. C.
AN EXAMINATION OF MODELS OF RELAXATION IN COMPLEX SYSTEMS. 1. CONTINUOUS TIME RANDOM WALK (CTRW) MODELS Interim Report, Apr. - Oct. 1985
K. L. Ngai, R. W. Rendell, A. K. Rajagopal, and S. Teitler 4 Feb. 1986 39 p refs
(AD-A164462; NRL-MR-5719) Avail: NTIS HC A03/MF A01 CSCL 12/1

Models of relaxation in complex systems based on the continuous time random walk (CTRW) formalism are examined on the basis of: (1) their robustness; (2) the nature of technical procedures employed; (3) the appropriateness of assumptions when subjected to physical tests; (4) the inclusion of a description of establilshed experimental results; and (5) the consistency of predictions with experimental results. Inadequacies of the CTRW models are shown to exist for all these features. It is concluded tha CTRW models, as they exist today, must be rejected as viable decriptions of the relaxation process in complex systems. GRA

N86-26082# Naval Ship Research and Development Center, Annapolis, Md. Ship Materials Engineering Dept.
AN EVALUATION OF J-R CURVE TESTING USING THREE POINT BEND SPECIMENS
M. T. Kirk and E. M. Hackett Jan. 1986 51 p refs
(AD-A164509; DTNSRDC/SME-85/87) Avail: NTIS HC A04/MF A01 CSCL 20/11

This investigation concerns the accuracy of load line deflection measurement techniques used in J integral-R curve testing of three point bend specimens (bendbars). Four methods of load line deflection measurement were investigated. One method employed a calibrated transducer that gave a direct reading of load line deflection. The other three methods mathematically related load line deflection to some other displacement (i.e., crack mouth opening displacement, cross head displacement) measured during testing. Photographs taken at regular intervals during loading provided an absolute measure of load line deflection. In comparison to this reference, the other methods had equal accuracy with varying degrees of precision. In no case, however, did the measurements from the laboratory techniques deviate from the photographic reference by more than 0.052 mm (0.002 in.) on average. The small differences between the load line deflections measured by the various laboratory techniques cause less scatter in the J-R curves and J sub IC values than attributable to material variability. Further, J-R curves over the first 1.75 mm of crack extension from both bendbars and compacts were shown to be coincident for the alloys tested. Author (GRA)

N86-26083# Naval Postgraduate School, Monterey, Calif.
LINEAR ALGEBRA USING PASCAL MT+ Technical Report, Oct. 1982 - Oct. 1984
Larry Williamson Jan. 1986 94 p refs
(AD-A164517; NPS53-86-0001) Avail: NTIS HC A05/MF A01 CSCL 09/2

This thesis includes the documentation and source listing of a user friendly interactive computer program that (1) solves simultaneous linear equations, (2) calculates the eigensystems of a square real matrix, and (3) finds the roots of a real polynomial. It is written in PASCAL MT+, the DRI implementation of Pascal, under the CPM86 operating system for the IBM PC. With the use of nested menus and keyboard filtering, the program requires no learning on the user's part. It channels the user in the right direction. Input matrices are entered from the keyboard while the answers may be outputted to the screen and/or printer. The documentation along with the source listing describe how to develop a large, user friendly program through the use of modular techniques such as overlays. Author (GRA)

N86-26084# Yale Univ., New Haven, Conn. Dept. of Computer Science.
RAPID SOLUTION OF INTEGRAL EQUATIONS OF SCATTERING THEORY IN TWO DIMENSIONS
V. Rokhlin Nov. 1985 28 p
(Contract N00014-82-K-0184)
(AD-A163193; YALEU/DCS/RR-440) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper describes an algorithm for rapid solution of boundary value problems for the Helmholtz equation in two dimensions based on iteratively solving integral equations of acoustic scattering theory. The CPU time requirements of previously published algorithms of this type are of the order sq n, where n is the number of nodes in the discretization of the boundary of the scatterer. The CPU time requirements of the algorithm of the present paper are n raised, and can be further reduced, making it considerably more practical for large scale problems. Author (GRA)

N86-26157# Joint Publications Research Service, Arlington, Va.
SOME THEORY OF APPROXIMATION AND NUMERICAL ANALYSIS PROBLEMS Abstract Only
K. I. Babenko *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 65 Transl. into ENGLISH from Uspekhi Matematicheskikh Nauk (Moscow, USSR), v. 40, no. 1 (241), Jan. - Feb. 1985 p 3-28 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26158# Joint Publications Research Service, Arlington, Va.
FAST ALGORITHM FOR SOLVING A NETWORK DISTRIBUTION PROBLEM AND ITS APPLICATION Abstract Only
K. V. Kim and O. V. Ni *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 66 Transl. into ENGLISH from Izvestiya Akademii Nauk Kazakhskoy SSR. Seriya Fiziko-Matematicheskaya (Alma Ata, USSR), no. 1 (122), Jan. - Feb. 1985 p 87-89 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N86-26085# Wisconsin Univ., Madison. Mathematics Research Center.
ON THE EFFECT OF TWO-STAGE SAMPLING IN THE F STATISTIC Technical Summary Report
C. F. J. Wu, D. Holt, and D. J. Holmes Oct. 1985 32 p Sponsored in part by Wisconsin Univ., Madison, and by Economic and Social Research Council of the U.K.
(Contract DAAG29-80-C-0041; Grant NSF DMS-85-02303)
(AD-A163653; MRC-TSR-2877) Avail: NTIS HC A03/MF A01 CSCL 12/1

This document investigates the effect of intracluster correlation in two stage samples on the ordinary F procedures in linear models. A measure is proposed as a diagnostic and basis for correction to the F statistic. A decomposition of this measure is given in terms of the contributions of the individual regressors and their cross products. For known intracluster correlation the proposed correction to F performs very well in the numerical study. For unknown intracluster correlation a simple alternative to the generalized least squares procedure is proposed and is shown to perform favorably in the simulation study. Author (GRA)

N86-26086# California Univ., Berkeley. Electronics Research Lab.
CONTINUATION OF RESEARCH ON MULTIPARAMETER STOCHASTIC PROCESSES Final Report, 1 Apr. 1982 - 31 Aug. 1985
E. Wong Nov. 1985 5 p refs
(Contract DAAG29-82-K-0091)
(AD-A163763; ARO-18894.7-MA) Avail: NTIS HC A02/MF A01 CSCL 20/1

To study Markov processes with a multidimensional parameter necessitates the introduction of generalized processes that can be localized to surfaces. A vehicle for dealing with these is stochastic cochains, processes parameterized by k-dimensional surfaces in n-dimensional surface. The principal result of this project has been the development of a theory of stochastic cochains. Author (GRA)

N86-26087# Massachusetts Inst. of Tech., Cambridge.
ESTIMATION THEORY AND STATISTICAL PHYSICS
S. K. Mitter Dec. 1985 22 p refs
(Contract DAAG29-84-K-0005; Grant AF-AFOSR-0227-85)
(AD-A164054; LIDS-P-1518; ARO-20980.38-MA) Avail: NTIS HC A02/MF A01 CSCL 12/1

The construction of a nonlinear filter involves an integration over function space which is exactly analogous to the construction of a measure on path space via the Feynman-Kac-Nelson Formula. In Kalman-Bucy filtering problem the filtering of Gauss-Markov processes in the presence of additive white Gaussian noise occupies the same role as the Ornstein-Uhlenbeck process (finite or infinite-dimensional) in Quantum Mechanics or Quantum Field Theory. That this analogy is borne out by the fact that a solvable Lie algebra, the oscillator algebra which contains the Heisenberg algebra as a derived algebra is intrinsically attached to the Kalman-Bucy filtering problem. The problem of nonlinear filtering of diffusion processes was shown to admit a stochastic variational interpretation. The objective of this paper is to strengthen these analogies further with a view to showing the close relationship of estimation theory to statistical mechanics. The motivation for this comes from problems of estimation and inverse problems related to image processing. In order to carry out this program it is necessary to generalize these ideas to filtering problems for infinite-dimensional processes. There are two types of processes involved: continuous processes such as infinite-dimensional Ornstein-Uhlenbeck processes and their L2-functionals which represent intensities of images and processes of a discrete nature which will represent boundaries of images. GRA

N86-26088# Sandia National Labs., Albuquerque, N. Mex.
PROBABILISTIC RISK ASSESSMENT COURSE DOCUMENTATION. VOLUME 7: ENVIRONMENTAL TRANSPORT AND CONSEQUENCE ANALYSIS
Lynn T. Ritchie, Daniel J. Alpert, Richard P. Burke, Robert M. Ostmeyer, Geoffrey D. Kaiser, Gene E. Runkle (Raytheon Service Co., Burlington, Mass.), and Keith Woodard (Pickard, Lowe and Garrick, Inc., Washington, D.C.) Aug. 1985 399 p 7 Vol.
(Grant NRC FIN-A-1321)
(TI86-002575; NUREG/CR-4350/7; SAND85-1495/7) Avail: NTIS HC A17/MF A01

Consequence models were designed to assess health and economic risks from potential accidents at nuclear power plants. These models were applied to an ever increasing variety of problems with ever increasing demands to improve modeling capabilities and provide greater realism. The environmental transport of postulated radiological releases and the elements and purpose of accident consequence evaluation were examined. Topics addressed include: overview of health and economic consequence analysis; atmospheric transport and deposition modeling; exposure pathways; radiation dosimetry; estimating potential health effects; emergency response; economic consequences of reactor accidents; consequence modeling codes; and consequence modeling differences and issues. Author

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N86-26089# North Carolina Univ., Chapel Hill. Operations Research and Systems Analysis.
THE DISTRIBUTION OF MAXIMUM FLOW WITH APPLICATION TO MULTI-STATE RELIABILITY SYSTEMS
George S. Fishman Nov. 1985 44 p refs
(Grant AF-AFOSR-0140-84)
(AD-A163999; UNC/ORSA/TR-85/8; AFOSR-85-1257TR) Avail: NTIS HC A03/MF A01 CSCL 12/2

This paper describes an efficient Monte Carlo sampling plan for estimating the distribution of maximum flow in a directed network whose arcs have random capacities. Such a network can be used to represent a multistate system whose multistate components are subject to deterioration in capacity by random amounts at random points in time. The proposed sampling plan uses an easily computed a priori upper bound on the complementary distribution function to obtain an unbiased point estimator with smaller variance than crude Monte Carlo sampling allows. The paper also describes procedures for interval estimation and for assessing when the sampling experiment has achieved a specified accuracy. To facilitate sampling, the paper presents a characterization of deterioration based on cumulative processes, leading to the treatment of arc capacities as being multinormally distributed. A technique is described for checking the appropriateness of this model with regard to lower and upper bounds on capacity. A procedure is also described for deriving a confidence interval on the measure used to assess variance reduction. An example illustrates the sampling plan and a concise summary gives all steps needed to implement the plan. GRA

N86-26161# Joint Publications Research Service, Arlington, Va.
PARAMETRIC OPTIMIZATION OF ALGORITHM FOR ESTIMATING VALUES OF ONE CLASS OF UNSTEADY RANDOM PROCESSES Abstract Only
G. A. Kryzhanovskiy and V. I. Aleshin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 71 Transl. into ENGLISH from Izvestiya Akademii Nauk Kazakhskoy SSR: Seriya Fiziko-Matematicheskaya (Alma Ata, USSR), no. 5, Sep. - Oct. 1984 p 77-81 (For primary document see N86-26108 16-70) Avail: NTIS HC A05

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N86-26090# Argonne National Lab., Ill.
QUASI-NEWTON METHODS WITH BOUNDS
P. H. Calamai and J. J. More Oct. 1985 13 p refs
(Contract W-31-109-eng-38)
(DE86-004966; ANL/MCS-TM-60) Avail: NTIS HC A02/MF A01

We develop a quasi-Newton method which preserves known bounds on the Jacobian matrix. We show that this update can be computed with the same amount of work as competitive methods. In particular, we prove that the number of operations required to obtain this update is proportional to the number of nonzeros in the sparsity pattern of the Jacobian matrix. The method is also shown to share the local convergence properties of Broyden's and Schubert's method. DOE

N86-26091# Wisconsin Univ., Madison. Mathematics Research Center.
THE EQUATION c(z)t = PHI(zx))x: THE FREE BOUNDARY INDUCED BY A DISCONTINUITY IN THE DERIVATIVE OF c Technical Summary Report
M. Bertsch, M. E. Gurtin, and D. Hilhorst Sep. 1985 62 p refs
(Contract DAAG29-80-C-0041; Grant NSF DMS-84-04116)
(AD-A163630; MRC-TSR-2869) Avail: NTIS HC A04/MF A01 CSCL 12/1

The equation c(z)t - phi(zx)x arises in a theory for two interacting biological species that disperse in response to population pressure. We prove existence and uniqueness for this equation with appropriate initial and boundary conditions, and use these results to establish a solution, for arbitrary segregated initial-data, in which the two species remain segregated for all time. GRA

N86-26092# Oak Ridge National Lab., Tenn.
ABSTRACT TIME-DEPENDENT TRANSPORT EQUATION
V. Protopopescu 1985 15 p refs Presented at the 1st Workshop on Operator Theory and Applications, Amsterdam, Netherlands, 1 Jun. 1985
(Contract DE-AC05-84OR-21400)
(DE86-002450; CONF-8506210-1) Avail: NTIS HC A02/MF A01

The abstract time-dependent transport equation is considered as an evolution (initial-boundary value) problem in the Banach space L(sub p), 1 less than or equal to p < infinity. By using the trajectory method, the basic issues of existence, uniqueness, positivity, and dissipativity are settled for very general, possibly time-dependent domains, operators, and boundary conditions. DOE

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N86-26093# Brookhaven National Lab., Upton, N. Y.
TIME-SLICING SUBSYSTEM OF THE BIOLOGY SMALL-ANGLE X-RAY SCATTERING STATION AT THE NATIONAL SYNCHROTRON LIGHT SOURCE
F. W. Stubblefield Nov. 1985 10 p refs Presented at the IEEE Nuclear Science Symposium, San Francisco, Calif., 22-25 Oct. 1985
(Contract DE-AC02-76CH-00016)
(DE86-004354; BNL-37320; CONF-851009-42) Avail: NTIS HC A02/MF A01

The time-slicing subsystem of the Biology Small-Angle X-ray Scattering divides the time period during which the data for small-angle X-ray diffraction patterns from biological samples is collected into time slices (or frames). The subsystem, being part of a multiprocessor experiment control and data acquisition system, has its own dedicated processor; it also has special-purpose front-end electronics sufficient to generate the gating and other control signals required to produce a sequence of as many as 256 time slices, measured with a basic time unit of 1 (MU)sec. The electronics also synchronizes with execution of the time slice sequence the application of stimuli to the biological sample, the measurement of voltages generated by the sample, and the application of auxiliary device trigger pulses and routes detector data and auxiliary scaler data into appropriate time-slice-indexed buffers in a large external data memory array. The structure of the entire experiment control and data acquisition system is briefly reviewed. Details of the structure and operation of the time slice subsystem are presented. DOE

N86-26094*# National Aeronautics and Space Administration, Washington, D.C.
MEASUREMENT OF PARTIAL PRESSURES IN VACUUM TECHNOLOGY AND VACUUM PHYSICS
W. K. Huber Jun. 1986 22 p refs Transl. into ENGLISH from the book "Results of High-VAcuum Technology and the Physics of Thin Films, Vol. 2" Stuttgart, West Germany, Wissenschaftliche Verlagsgesellschaft, 1971 p 321-335 Original language document was announced in IAA as A72-36836 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-4004)
(NASA-TM-88438; NAS 1.15:88438) Avail: NTIS HC A02/MF A01 CSCL 20C

It is pointed out that the measurement of gaseous pressures of less than 0.0001 torr is based on the ionization of gas atoms and molecules due to collisions with electrons. The particle density is determined in place of the pressure. The ionization cross sections for molecules of various gases are discussed. It is found that the true pressure in a vacuum system cannot be determined with certainty if it is unknown which gas is present. Effects of partial pressure determination on the condition of the vacuum system are discussed together with ion sources, systems of separation, and ion detection. G.R.

N86-26095# Syracuse Univ., N. Y. Dept. of Electrical and Computer Engineering.
CHARACTERISTIC MODES FOR A SLOT IN A CONDUCTING PLANE
Karim Y. Kabalan, Roger F. Harrington, and Joseph R. Mautz Dec. 1985 110 p refs
(Contract N00014-85-K-0082)
(AD-A163523; SYRU/DECE/TR85/6; TR-2) Avail: NTIS HC A06/MF A01 CSCL 20/3

In this report, the theory of characteristic modes for slots is used to solve the problem of an infinitely long slot in a conducting plane in an unbounded medium illuminated by either a transverse electric or a transverse magnetic uniform plane wave. The characteristic currents are defined as the eigenfunctions of a certain generalized eigenvalue equation involving the admittance operator and its real part. The theory is general, applicable to wide as well as narrow slots, and gives a modal expansion of all quantities and parameters of interest usually encountered in electromagnetic compatibility problems. This modal expansion converges rapidly when the slot is narrow. The characteristic currents and fields, the equivalent magnetic current, and the radiation pattern are computed for different slot widths. Analytic expressions for the special case of a narrow slot are also given. GRA

N86-26096# Office of Naval Research, London (England).
EUROPEAN SCIENCE NOTES, VOLUME 40, NUMBER 2 Monthly Report
Larry E. Shaffer Feb. 1986 46 p
(AD-A163008; ESN-40-2) Avail: NTIS HC A03/MF A01 CSCL 05/2

ESN is a monthly publication with brief articles on recent developments in European scientific research. Its partial contents are: Biotechnology Research at GBF, and at the Inst. of Technical Chemistry, Univ. of Hanover, West Germany; 7th European Immunology Congress; Biotechnia '85 - First International Congress for Biotechnology; Acoustic Cavitation Generated by Clinical Ultrasound; Advances in Chemical Reaction Dynamics; Geophysics

Research in Israel; Fiber Composite Research at Paisley College of Technology, Scotland; A review of International Research on the Physical Metallurgy of Welding; Silicon Metallurgy at the Helsinki Technical Univ.; A Conference on Guided Optical Structures and Their Applications; Optoelectronics Research at Oxford Univ.; and Fractal Conferences in Europe. GRA

N86-26097# California Univ., Santa Barbara. Dept. of Physics.
DISCONTINUITY OF THE EXCHANGE CORRELATION POTENTIAL FROM A DENSITY FUNCTIONAL VIEWPOINT Technical Report, Jun. - Dec. 1985
W. Kohn 10 Feb. 1986 15 p refs Prepared in cooperation with Max-Planck-Inst. fuer Festkoerperforschung, Stuttgart, West Germany
(Contract N00014-84-K-0548; Grant NSF DMR-83-10117)
(AD-A164377; TR-5) Avail: NTIS HC A02/MF A01 CSCL 20/3

The calculation of energy gaps of insulators is an important theory objective. A commonly used method is density functional theory. Recently it was shown that an unexpected difficulty (discontinuity of the exchange correlation potential) arises. This paper makes a contribution towards the understanding of this problem. The discontinuity is expressed in terms of changes of the exchange correlation energy, E sub xc, of a perfect N-particle insulator when (1) a conduction electron is introduced (2) a valence electron is removed and (3) an external perturbation is applied to the perfect insulator (without changing N) such that the density change is equal to minus the sum of the density changes in (1) and (2). GRA

N86-26098# National Bureau of Standards, Gaithersburg, Md.
JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS, VOLUME 90, NUMBER 5, SEPTEMBER-OCTOBER 1985
Oct. 1985 64 p
(PB86-166782) Avail: NTIS HC A04/MF A01; also available SOD HC $3.00 as SN703-027-00006-7 CSCL 14B

The Journal of Research of the National Bureau of Standards, Volume 90, Number 5, September-October l985, contains articles on the following topics: Note on Weighings Carried Out on the NBS-2 Balance; Thermodynamics of Solution of SO2(g) in Water of Aqueous Sulfur Dioxide Solutions; SRM 1970: Succinonitrile Triple-Point Standard-A Temperature Reference Near 58.08C; Performance Assessment of Automatic Speech Recognizers; and Chemical Kinetics-Theory and Experiment. GRA

N86-26099# Joint Publications Research Service, Arlington, Va.
USSR REPORT: PHYSICS AND MATHEMATICS Abstracts Only
14 Mar. 1986 124 p Transl. into ENGLISH from various Russian articles
(JPRS-UPM-86-006) Avail: NTIS HC A06/MF A01

Topics on physics and mathematics from foreign newspapers, periodicals and books and news agency transmissions and broadcasts presented include: acoustics; crystals, laser glasses and semiconductors; gas dynamics; fluid dynamics; high temperature physics; lasers; magnetohydrodynamics; nuclear physics; optics and spectroscopy; plasma physics; thermodynamics; numerical analysis; control theory; logic and game theory; operations research and differential equations. For individual titles, see N00-00001 through N00-00008. For individual titles, see N86-26100 through N86-26107.

N86-26100# Joint Publications Research Service, Arlington, Va.
FINAL STAGE OF DEGENERACY OF TURBULENT VELOCITY FIELD IN WAKE STREAM Abstract Only c34
I. I. Kovalev, B. A. Kolovandin, and N. N. Luchko *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 10 Transl. into ENGLISH from Inzhenerno-Fizicheskiy Zhurnal (Minsk, USSR), v. 49, no. 2, Aug. 1985 p 209-214 Original language document was announced in IAA as A85-46247 (For primary document see N86-26099 16-70)
Avail: NTIS HC A06/MF A01

A three parameter differential model is used to obtain analytical expressions describing the evolution of the characteristics of the velocity fields of axisymmetric and plane wake flows in the asymptotic case of weak turbulence for various values of the excess impulse. The exponents of the power laws of attenuation are shown to depend on the values of the empirical coefficients of the model. The results obtained are compared with the asymptotic laws proposed by Phillips (1955). V.L.

N86-26101# Joint Publications Research Service, Arlington, Va.
SUBSURFACE PLASMA IN BEAM OF CONTINUOUS CO2-LASER Abstract Only c36
Ye. V. Danytsikov, V. A. Dymshakov, F. V. Lebedev, V. D. Pismennyy, and A. V. Ryazanov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 16 Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Seriya Fizicheskaya (Moscow, USSR), v. 49, no. 4, Apr. 1985 p 811-828 (For primary document see N86-26099 16-70)
Avail: NTIS HC A06/MF A01

Experiments performed at the Institute of Atomic Energy established the conditions for formation of subsurface plasma in substances by laser radiation and its characteristics. A quasi-continuous CO2 laser emitting square pulses of 0.1 to 1.0 ms duration and 1 to 10 kW power as well as a continuous CO2 laser served as radiation sources. Radiation was focused on spots 0.1 to 0.5 mm in diameter and maintained at levels ensuring constant power density during the interaction time, while the temperature of the target surface was measured continuously. Metals, graphite and dielectric materials were tested with laser action taking place in air N2 + O2 mixtures, Ar or He atmosphere under pressures of 0.01 to 1.0 atm. Data on radiation intensity thresholds for evaporation and plasma formation were obtained. On the basis of these thresholds, combined with data on energy balance and the temperature profile in plasma layers, a universal state diagram was constructed for subsurface plasma with nonquantified surface temperature and radiation intensity coordinates. B.G.

N86-26102# Joint Publications Research Service, Arlington, Va.
COMPUTER SIMULATION OF PROCESSES IN SOLID-STATE LASER OSCILLATORS AND AMPLIFIERS WITH PHOTOTUBE PUMPING: LASER PUMPING SYSTEMS Abstract Only c36
V. M. Gradov, G. I. Kromskiy, A. A. Mak, G. V. Sklizkov, S. I. Fedotov, and A. A. Shcherbakov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 42-43 Transl. into ENGLISH from Preprint no. 105, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26099 16-70)
Avail: NTIS HC A06/MF A01

Optical pumping systems for solid state lasers are evaluated comparatively on the basis of a mathematical model of processes and the results of computer simulation. The principal criterion for comparison is the overall energy efficiency, assuming that two essential requirements are met: a pumping power level adequate for attainment of the emission or amplification threshold and uniform distribution of the pumping radiation density above the threshold level over the active medium. The method covers spherical and cylindrical surfaces. The general algorithm of the solution of the corresponding integral and differential equations was programmed for a self consistent calculation of the pumping system characteristics. The method is applied to two different pumping systems where discharge produces an optically dense plasma and an optically thin plasma respectively. Analysis and calculations are particularized for several known variants of these pumping systems with various modes of laser emission tuning. B.G.

N86-26103# Joint Publications Research Service, Arlington, Va.
CHARACTERISTICS OF X-RADIATION EMITTED DURING FOCUSING OF LASER BEAMS ON SOLID TARGETS: RADIATION LOSSES IN MULTICHARGE PLASMA Abstract Only c36
V. A. Vinogradov and V. N. Shlyaptsev *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 65 Transl. into ENGLISH from Preprint no. 11, Lebedev Physical Inst.,

Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26099 16-70)
Avail: NTIS HC A06/MF A01

Propeties of X-radiation in the X-ray lithographic 8 to 10 A region of the spectrum emitted by a homogeneous multicharge plasma are evaluated within the ranges of temperature and density characteristic of a laser plasma above solid targets. Based on numerical analysis, analytical relations are established for atomic and ionization constants. Ionization and photorecombination rates in a steady plasma as well as in a fast excited and recombining one are determined, taking into account the relationship between ionicity distribution of atoms and electron concentration. A steady plasma is one in a state of local ionization equilibrium, which in the extreme cases of very low density and very high density becomes the state of local corona equilibrium and the state of local thermodynamic equilibrium, respectively. The rates of radiation process are calculated next assuming a plasma optically thin for its intrinsic radiation. The radiation losses in the plasma are then calculated. The losses and spectral distribution of radiation energy are determined separately for a steady and nonsteady plasma. Author

N86-26104# Joint Publications Research Service, Arlington, Va.
IMPACT DEFORMATION OF METALS TAKING INTO ACCOUNT BULK MODULUS AND TEMPERATURE Abstract Only
V. P. Mayboroda and N. N. Kholin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 76-77 refs Transl. into ENGLISH from Izvestiya Akademii Nauk SSSR: Mekhanika Tverdogo Tela (Moscow, USSR), no. 4, Jul. - Aug. 1985 p 103-110 (For primary document see N86-26099 16-26)
Avail: NTIS HC A06/MF A01

Dynamic inelastic deformation of metals under impact is analyzed on the basis of a thermodynamic model which accounts for dependence on both the temperature and the bulk modulus of the material. The thermodynamic state of a metal is accordingly determined by the elastic strain tensor, the absolute temperature and the internal state described by the corresponding equations of kinetics. Stipulating an extremal deformation process rather than any other possible process of inelastic deformation and assuming that all elasticity constants of a metal are independent of its inelastic properties, an associated law of plastic flow is formulated which yields an inelastic strain rate tensor separable into strains dependent on and strains independent of the time scale. The law also yields the corresponding dissipation function. For specificity a Mises-Schleicher kind of hardenable material is considered. Deformation of such a metal at high temperature and pressure is analyzed on the basis of the Navier-Stokes equatons of flow for a compressible medium with axial symmetry and the Mie-Grueneisen equation of state. Author

N86-26105# Joint Publications Research Service, Arlington, Va.
COMPUTER SIMULATION OF PROCESSES IN SOLID-STATE LASER RADIATORS AND AMPLIFIERS WITH GLOW-TUBE PUMPING: ELECTRIC-DISCHARGE PUMPING SOURCES. THERMOPHYSICAL PROCESSES IN ENVELOPE AND ELECTRODES OF PULSE PUMPS Abstract Only c36
V. M. Gradov, V. I. Zhiltsov, G. V. Sklizkov, Yu. I. Terentyev, S. I. Fedotov, and A. A. Shcherbakov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 88-89 Transl. into ENGLISH from Preprint no. 189, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26099 16-70)
Avail: NTIS HC A06/MF A01

Thermophysical processes in pulse pumps for solid state lasers are analyzed on the basis of the results of computer simulation according to a theoretical model which includes mechanical and thermal stresses in the pump components. The thick walled pump envelope is assumed to be in a plane state of stress and strain under axisymmetric load consisting of internal pressure and heat. The corresponding system of equations covers pressure and temperature transients as well as the steady state mechnical and thermal stresses. The mathematical model emphasizes cathodic processes at the cathode surface and in the boundary layer. The corresponding system of equations is solvable by the Runge-Kutta method. Separate consideration is given to mechanical wear of the pump envelope and electrodes for which a physico-chemical structure and processes were also constructed and programmed. Author

N86-26106# Joint Publications Research Service, Arlington, Va.
COMPUTER SIMULATIONS OF PROCESSES IN SOLID-STATE LASER RADIATORS AND AMPLIFIERS WITH PHOTOTUBE PUMPING: ELECTRIC-DISCHARGE PUMPING SOURCES. ARC DISCHARGES Abstract Only c36
V. M. Gradov, A. A. Mak, G. I. Kromskiy, G. V. Sklizkov, S. I. Fedotov, and A. A. Shcherbakov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 89 Transl. into ENGLISH from Preprint no. 190, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26099 16-70)
Avail: NTIS HC A06/MF A01

Problems of modeling and computer simulation are analyzed in reference to the design of solid state laser devices with glow tube pumping. Electric pulse and arc discharges are considered specifically. A model was constructed for a cylindrically symmetric column in the diffusion approximation with the correspoinding system of differential equations put in a form for most efficient and accurate simulation of the processes. For most economical use of the computer, the radiation spectrum is optimally subdivided into intervals. It is necessary to validate the assumption of a plasma in the state of local thermodynamic equilibrium by first accounting for and then discounting the various factors which disturb that equilibrium, namely emission of radiation and temperature gradients, as well as diffusion of charged particles toward the walls. In the case of arc discharge, a theory and a model are constructed for determining the electrophysical characteristics and the radiation characteristics of such discharge in inert gases and in vapors of alkali metals. Author

N86-26107# Joint Publications Research Service, Arlington, Va.
CONTROL OF MANIPULATOR IN SINGULAR POSITIONS Abstract Only
V. A. Glazunov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-009) 14 Mar. 1986 p 98 Transl. into ENGLISH from Preprint no. 189, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26099 16-70)
Avail: NTIS HC A06/MF A01

A manipulator is considered whose kinematic chain, an open one consisting of six rotationally paired, can assume singular positions where the translation vectors of the six axes cease to be independent of one another. The last link holds a tong which can assume any position in space within the range defined by the six axes of the chain and whose initial displacement can generally be infinitesimal, as in bioengineering systems with velocity/vector control. The problem is to dislodge the tong from such a position by means of a kinematic screw. Control of the manipulator involves two operations, detection of a singular position and selection of the kinematic screw which most closely approximates the required one. In the simplest case the control problem is solved on the basis of a local criterion and on testing a manipulator position for one particular singularity. In automatic contour control, the criterion is generally a global one covering the entire set of possible singular positions. B.G.

N86-26108# Joint Publications Research Service, Arlington, Va.
USSR REPORT: PHYSICS AND MATHEMATICS
21 Jan. 1986 88 p Transl. into ENGLISH from various Russian articles
(JPRS-UPM-86-001) Avail: NTIS HC A05/MF A01

Topics on physics and mathematics from foreign newspapers, periodicals and books, and news agency transmissions and broadcasts addressed include: crystals and semiconductors; gas dynamics; fluid dynamics; lasers; magnetohydrodynamics; nuclear physics; optics and spectroscopy; electro-optics; plasma physics; thermodynamics; numerical analysis and statistics;

algorithms; control theory; and differential equations. For individual titles, see N86-26109 through N86-26161.

N86-26109# Joint Publications Research Service, Arlington, Va.
FAST METHOD OF GROWING CRYSTALS FOR NONLINEAR OPTICS Abstract Only c76
In its USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 1 refs Transl. into ENGLISH from NTR: Problemy i Resheniya (Moscow, USSR), 18 Jun. - 1 Jul. 1985 p 4 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

A method for rapidly growing nonlinear optical crystals from aqueous solutions was developed at the USSR Academy of Sciences Institute of Applied Physics in Gor'kiy. Such crystals are used for controlling laser beams, which makes it possible to deflect beams, and change wavelengths. Previously, the rate of growth of such crystals was about 0.5 to 1.0 millimeters per day. For example, it took more than a year to grow a crystal 15 millimeters in diameter, from which an element for multiplying the beam frequency is made. On the basis of the proposed method, equipment and a process for growing crystals at a rate of 0.5 to 1.0 millimeters per hour were developed. This shortens the time it takes to grow a crystal to several days. Author

N86-26110# Joint Publications Research Service, Arlington, Va.
SUBMILLIMETRIC-WAVE LUMINESCENCE OF CdS SINGLE CRYSTALS DURING OPTICAL PUMPING Abstract Only c76
Yu. A. Mityagin, V. N. Murzin, and S. A. Stoklitskiy *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 2 refs Transl. into ENGLISH from Kratkiye Soobshcheniya Po Fizike (Moscow, USSR), no. 5, May 1985 p 28-31 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

The emission of submillimetric wave radiation of CdS single crystals was studied during high intensity pumping. Specimens of CdS crystals were placed on the cold plate of a helium cryostat and excited over a spot 0.3 to 1 mm in diameter either by an N2 laser with radiation pulses of 10 ns duration and approximately 1 kW power at 337.1 nm or by a Q-switched YAG laser with third harmonic pulses of 10 ns duration and 10 kW power at 335 nm. The temperature of a specimen was varied over the 10 to 180 K range by adjustment of the pumping pulse repetition rate and was read either by the position of the green laser emission line or, within the l.6 to 4.2 K range, by a thermometer also immersed in the liquid helium. Only thermal radiation was detected at temperature below 100 k, attributable to adiabatic heating of the surface layer. Intense submillimetric wave luminescence within the 50 to 90 micron range was recorded by a Ge(Ga) detector above the 100 K threshold, its power increasing almost linearly and reaching levels to 2 to 3 orders of magnitude above that of thermal radiation. This luminescence is attributable to 2p-1s transitions of A-excitons from excited state to ground state, at a frequency corresponding to the wavelengths. B.G.

N86-26111# Joint Publications Research Service, Arlington, Va.
STIMULATED MANDELSTAM-BRILLOUIN SCATTERING IN CRYSTALS Abstract Only c76
M. Sattikulov, V. V. Demanov, and V. A. Muminov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 3 Transl. into ENGLISH from Izvestiya Akademii Nauk UZ SSR. Seriya Fiziko-Matematicheskikh Nauk (Tashkent, USSR), no. 1, Jan. - Feb. 1985 p 74-78 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

Optical and acoustic aspects of collinear stimulated Mandelstam-Brillouin scattering are investigated simultaneously in a number of crystals (SiO2, LiNbO3, and Al2O3) for forward and backward scattering. The stimulated emission thresholds are measured under identical experimental conditions for the same crystals, and the generation of acoustic (ultrasonic) waves during forward scattering stimulated emission is investigated. All other conditions being equal, it is found that the experimental threshold for stimulated Mandelstam-Brillouin backscattering is higher than for forward scattering. Author

N86-26112# Joint Publications Research Service, Arlington, Va.
MICROWAVE ABSROPTION IN GLASS HEATED BY LASER RADIATION Abstract Only c36
N. Ye. Kask, M. A. Kovalyev, G. M. Fedorov, and D. B. Chopornyak *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 3 Transl. into ENGLISH from Fizika i Khimiya Stekla (Leningrad, USSR), v. 11, no. 1, Jan.-Feb. 1985 p 68-74 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

The possibility of investigating the conductivity of glass by using local laser heating and microwave diagnosis is demonstrated. The results of conductivity testing for ZhS 12 silicate glass are presented. The proposed microwave measurement method makes it possible to investigate the electrical properties of glasslike materials over a wider range of temperatures. Structural realignments show up during rapid laser heating at temperatures exceeding 1300 K, thus expanding the interval in which glass conductivity can be investigated in the solid state. The proposed method can be used to study glass forming matter at up to approximately 2500 K in the melted state, and in the plasma state at even higher temperatures. The solid state conductivity of ZhS 12 glass is characterized by an activation energy of 0.18 eV; that of the melted state is 0.85 eV. Author

N86-26113# Joint Publications Research Service, Arlington, Va.
IMPURITY ABSORPTION BY CHALCOGENIDE GLASSES IN CO LASER EMISSION REGION Abstract Only c36
V. G. Plotnichyenko and V. K. Sysoyev *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 4 Transl. into ENGLISH from Fizika i Khimiya Stekla (Leningrad, USSR), v. 11, no. 1, Jan.-Feb. 1985 p 105-107 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

The mechanism governing the high optical losses in chalcogenide glasses in the region of CO laser radiation (5 to 6 microns) is determined by investigating laboratory and commercial specimens of arsenic trisulfide and arsenic triselinide glasses, as well as commercial IKS series glasses. In examining the transmission spectra of various chalcogenide glasses, high nonselective absorption is noted in the emission region of CO lasers. This absorption occurs on impurities, which can be seen in As2S3 by ordinary microscopy, and in As2Se3 and IKS-29 by infrared microscopy. Atomary carbon and silicon dioxide are felt to determine the high level of optical losses in the frequency range in question. Author

N86-26114# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF DEGRADATION PROCESSES IN ELECTRON-BEAM PUMPED CdS LASERS USING A TRANSMISSION ELECTRON MICROSCOPE Abstract Only c36
G. V. Bushuyeva, S. A. Pendor, A. N. Pechenov, A. A. Predvoditelev, V. I. Reshetov, and P. V. Shapkin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 4 Transl. into ENGLISH from Preprint no. 65, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

The use of transmission electron microscopy to identify structural defects occurring during the growth and irradiation of cadmium sulfide by a focused electron beam with electron energy of up to 100 keV and current density up to 300 A/sq cm is described. The influence of these defects on the radiating properties of the semiconductor is studied. A JFM-100 U electron microscope was employed. Cathode luminescence measurements and long term irradiation of CdS crystals were found to exhibit significant numbers of defects at 300 K, which can be classified as small segregations with maximum volumetric density of approximately 10 to the 14th power/cu cm. Besides segregations, individual dislocations and groups of dislocations were observed in large CdS crystals. Electron microscopic investigation of CdS

revealed both motion and multiplication of dislocations in the base plane. The segregation density is found to depend strongly upon the growth conditions. The fast stage of gradual crystal degradation in metastable crystals is strongly influenced by the process associated with the increased space taken up by segregations.
Author

N86-26115# Joint Publications Research Service, Arlington, Va.
PROCESSES OF EXCITATION AND RELAXATION BY Nd SUP 3+ IN CERTAIN SEMICONDUCTOR MATRICES Abstract Only **c76**
Arzu Ali ogly Mamedov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 5 Transl. into ENGLISH from Akademiya Nauk SSSR Institut Obshchey Fiziki Dissertation Abstracts (Moscow, USSR) (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

Population mechanisms of the upper lasing level of neodymium in alpha-La2S3:Nd(3+) crystals and La2S3 * 2Ga2O3:Nd(3+) and La2S3 * 2Ga2S3:Nd(3+) glasses are established. Unsteady radiation of neodymium is detected from states above the metastable state caused by low rate of relaxation of excitation from the absorption bands into the metastable state. The intermultiplet transitions responsible for unsteady radiation are identified. The decay curves of the metastable state of neodymium in La2O2S, La2S3 * 2Ga2O3, and La2S3 * 2Ga2S3 are calculated throughout the entire time interval investigated. The minimum distances between neodymium ions in glasses are determined.
Author

N86-26116# Joint Publications Research Service, Arlington, Va.
EFFECT OF DIFFUSION CONSTRAINTS ON COMPOSITION OF VAPOR PHASE DURING GROWTH OF CdS AND ZnSe CRYSTALS Abstract Only **c76**
Ye. I. Panasyuk, M. S. Kleybanov, A. D. Levit, and V. K. Yakushin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 6 Transl. into ENGLISH from Kratkiye Soobshcheniya Po Fizike (Moscow, USSR), no. 6, Jun. 1985 p 6-9 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

Evolution of the vapor phase during growth of CdS and ZnSe crystals in a vertical reactor with helium by the Markov-Davydov method is analyzed on the basis of a model which takes into account mechanical and thermal diffusion of the components besides interdiffusion of each with helium. Considering that mass transfer by both diffusion mechanisms is the limiting stage of the growth process, the corresponding equations which describe the process are solved for the ratio of partial pressures P sub Cd,Zn/P sub S,Se and its profile along the growth axis in the reactor. This ratio is found to decrease or increase along the axis depending on the direction of departure from the equilibrium condition at the source, with the magnitude of decrease or increase increasing as the deviation from that equilibrium condition increases. The effect of thermal diffusion becomes more appreciable with lowering of the absolute temperature and with increasing of the temperature gradient.
Author

N86-26117# Joint Publications Research Service, Arlington, Va.
PROPAGATION OF SHOCK WAVES THROUGH PETROLEUM SUSPENSIONS Abstract Only **c34**
K. V. Mukuk, S. M. Makhkamov, and Kh. Kh. Azizov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 8 Transl. into ENGLISH from Izvestiya Akademii Nauk Uzbekskoy SSR: Seriya Tekhnicheskikh Nauk (Tashkent, USSR), no. 4, Jul. Aug. 1985 p 50-52 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

Anomalous shock wave propagation through petroleum with a high paraffin content was studied in an attempt to confirm the theoretically predicted breakdown of a forward shock wave into oscillating waves and wave packets as well as individual solitons. Tests were performed in a shock tube at 10, 20, and 50 to 60 C, with pure kerosene as reference and with kerosene + 5, 10, 15, and 20% paraffin. The addition of paraffin was found to radically alter the rheodynamic characteristics of the medium and, along with it, the pattern of shock wave propagation. The integro-differential equation describing a one dimensional hydraulic shock process in viscoelastic fluids is reduced to the Burgers-Korteweg-deVries equation, which is solved numerically for given values of the system parameters. The results indicate that the theory of shock wave propagation through such an anomalous suspension must be modified.
B.G.

N86-26118# Joint Publications Research Service, Arlington, Va.
LASER RADIATION IN ZnSe EXCITED BY GUNN DOMAINS IN STREAMER DISCHARGE CHANNEL Abstract Only **c36**
V. D. Dubrov, I. Ismailov, A. Z. Obidin, A. N. Pechenov, and Yu. M. Popov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 10 Transl. into ENGLISH from Kratkiye Soobshcheniya Po Fizike (Moscow, USSR), no. 6, Jun. 1985 p 3-5 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

Laser radiation in ZnSe was obtained experimentally by combing impact ionization in a Gunn diode with directional streamer discharge. Each method alone is capable of producing strong electric field pulses for appropriate excitation of ZnSe but each having its limitations. Specimens of 25 micron thick plane-parallel ZnSe plates were coated with dielectric mirror on both sides of a quality corresponding to an overall reflection coefficient R sub 1 x R sub 2 = 0.98 and then excited with 55 kV voltage pulses of 10 ns duration. The experimental data indicated that laser sources in ZnSe appear upon formation of Gunn strong field domains in the discharge channel, with discharge above the Gunn effect threshold and with domains moving through the crystal at a velocity of 1 to 1.5 billion cm/s. The radiation power in the emission mode was 50 W at a temperature of 300 K, but optimization of both resonator and excitation circuit should make higher power levels feasible.
Author

N86-26119# Joint Publications Research Service, Arlington, Va.
THRESHOLD CONDITIONS FOR DAMAGE TO POTASSIUM CHLORIDE SINGLE CRYSTALS EXPOSED TO CW CO-2 LASER RADIATION Abstract Only **c36**
A. A. Blistanov, N. M. Voloshinskaya, Ye. P. Glotov, Kh. Z. Bugaidullina, I. A. Zabolotskikh, V. N. Koterov, O. M. Kugayenko, V. V. Sumerin, V. A. Ulyanov, and N. V. Cheburkin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 13 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2389-2396 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

Criteria are derived for damage to laser output windows for potassium chloride due to the thermal effect of laser radiation. A definition for damage criterion based on solution to an unsteady problem of thermal elasticity is proposed. The damage characteristics for single potassium chloride crystals by continuous focused laser radiation are investigated experimentally. Damage begins at the forward surface of the crystal and is caused by strong tangential stresses. A phenomenological constant is derived for this damage that can be used to design output windows for continuous wave CO2 lasers. This constant is an integral characteristic for an output window with a defined working surface, and can be used to calculate the maximum radiated power that can be lased through crystal windows in high power technological lasers.
Author

N86-26120# Joint Publications Research Service, Arlington, Va.
GENERATION OF FREQUENCY-TUNABLE ULTRASHORT PULSES IN A DYNAMIC DISTRIBUTED FEEDBACK LASER Abstract Only **c36**
V. I. Bezrodnyy, Ye. I. Zabello, and Ye. A. Tikhonov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 14 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2438-2442 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

The formation of a dynamic lattice and the generation of tunable

ultrashort pulses in an active medium using ultrashort pulses from a solid state laser is investigated. Dynamic distributed feedback is achieved in a Nd(3+):YAG laser by employing an interference circuit in which the pumping pulses are divided. The lengths of the ultrashort pulses are measured by means of an Agat-SF high speed camera. The optical system of a distributed feedback laser employing counter propagating pumping beams is found to be suitable for ultrashort pulse lasers exhibiting lasing efficiency of approximately 3%, divergence of approximately 1 mrad with the use of a correcting lens, and a tunable range of 20 to 30 nm.
Author

N86-26121# Joint Publications Research Service, Arlington, Va.
THEORY OF SURFACE DAMAGE TO NONTRANSPARENT MATERIALS BY LASER RADIATION Abstract Only c36
A. A. Vedenov, O. P. Ivanov, and A. L. Chernyakov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 15 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2438-2442 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

The dynamics of a surface subjected to powerful laser radiation is investigated by local approximation, for which the rate of damage to the material is proportional to the density of the absorbed energy flux. An equation for the surface dynamics is derived which describes the relationship between the coefficient of absorption and the angle of incidence. The problem of determining the surface shape at different times reduces to a quadrature problem for a plane-parallel beam. The depth of the cut as a function of rate is analyzed for both polarizations. The analysis shows that the depth should be greater for longitudinal polarization. Intrinsic mode propagation in a waveguide with low attenuation is analyzed. The relationship between the radius of the waveguide close to its input and the length of the waveguide can be described by a step function initially, and then approaches steady state values asymptotically.
Author

N86-26122# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF THE INFLUENCE OF PUMP PROFILING ALONG THE OPTICAL AXIS ON TELESCOPIC-CAVITY ELECTRO-IONIZATION LASER OUTPUT CHARACTERISTICS Abstract Only c36
S. S. Kozyuchenok, V. A. Rodichkin, V. P. Tomashevich, and V. F. Shanskiy *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 16 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2461-2464 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

The effect of positioning the active medium in an unstable cavity and profiling the pumping power along the optical axis on the radiated energy of a CO2 laser is investigated. The laser employed contained two TIR-1m intermediate amplification stages consisting of two identical modules with independent discharge. Both modules were in a common telescopic cavity with a base of 3.2 meters and magnification of M = 2. When one of the modules was pumped, the efficiency with which the excitation energy was converted to radiation was higher than when the module next to the convex mirror was pumped. When both modules were pumped simultaneously, efficiency doubled to 11%. When pumping energy was fixed in one of the modules and increased in the other, radiated energy increased more rapidly than when pumping energy was constant in the first module. The experimental data agree qualitatively with the theoretical predictions. When several modules are employed in a common telescopic cavity, the stages with the greatest gain should be placed so that they occupy most of the volume of the amplification zone of the cavity.
Author

N86-26123# Joint Publications Research Service, Arlington, Va.
LASING CHARACTERISTICS OF A POSITIVE ELECTROOPTICAL FEEDBACK NEODYMIUM LASER Abstract Only c36
A. V. Agashkov and Yu. F. Morgun *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 17 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2465-2470 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

The lasing characteristics of a positive electro-optical feedback neodymium laser were investigated. The influence of Q-switching on the dynamics of the radiation field for ordinary Q-switching, for positive electro-optical feedback and for Q-modulation using an LiF(F2) crystal shutter is studied. The experimentally observed behavior of the duration energy and repetition frequency of a giant pulse and the initial transmission of the shutter agree qualitatively with calculations based on equations for a positive electro-optical feedback laser. The use of positive electro-optical feedback makes it possible to obtain giant pulses with assigned peak power, and makes the peak power independent of the power of the pumping pulse as long as the lasing threshold is exceeded for a given T sub o. The radiation field was found to exhibit a filament structure because of a lengthy linear stage in the oscillation development. Positive electro-optical feedback expands the functional capabilities of giant pulse lasers. The relationship between output parameters and control voltages allows computer automated control of the lasers.
Author

N86-26124# Joint Publications Research Service, Arlington, Va.
CHLORINE MONOFLUORIDE-HYDROGEN ELECTRIC DISCHARGE CHEMICAL LASER Abstract Only c36
V. B. Kolovskiy, S. A. Drobakha, G. P. Zhitneva, G. A. Abakumov, and A. P. Simonov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 17-18 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2507-2509 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

The lasing characteristics of a ClF-H2-M mixture with short pulsed initiation of chemical reactions in a transverse electrical gas discharge are investigated. Experiments were conducted on a setup incorporating a discharge chamber in an optical cavity, two pulse power sources, a synchronization unit, a gas injection and evaluation system, and a system to record the energy, pulse shape and spectral composition of the laser radiation, and to measure electrical energy in the discharge. The laser provided 60% efficiency, unit output of 4 J/l and pulse power of 0.4 MW with combined HF and HCl pulse energy of 0.16 J. The results demonstrate the possibility of using ClH-H2-He as the active medium in a sufficiently efficient, easy to operate electric discharge chemical laser that is discretely tunable in four regions of the near infrared band for laser chemistry and spectrascopic applications.
Author

N86-26125# Joint Publications Research Service, Arlington, Va.
LASER CAVITIES WITH DIFFRACTION GRATINGS IN AUTOCOLLIMATION MODE Abstract Only c36
V. N. Beltyugov, V. N. Ochkin, N. N. Sobolev, Yu. V. Troitskiy, and Yu. B. Udalov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 18 Transl. into ENGLISH from Preprint no. 37, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

Frequency selective losses in laser cavities with circular apertures containing diffraction gratings are investigated experimentally and theoretically. A cavity incorporating a tilted plane mirror used to compute the frequency selective loss function is described. Calculations for a wide range of cavity parameters make it possible to apply the findings to infrared lasers, for which the region of confocality and Fresnel number of parameters employed is characteristic. Carbon dioxide laser experiments confirm the findings. The influence of radial inhomogeneity of the active medium is found to consist primarily of changes in the amount of nonselective losses as compared with a hollow cavity. Selective losses remain practically unchanged. The influence of the beam spreader on the selectivity is found to be insufficient in certain cases for realizing an amplification zone above the threshold, even for comparatively low pressure lasers.
Author

N86-26126# Joint Publications Research Service, Arlington, Va.
POLARIZATION CHARACTERISTICS OF A SECONDARY GAMMA-RAY DURING LIGHT SCATTERING BY RELATIVISTIC ELECTRONS Abstract Only **c36**
V. A. Murashova, G. S. Pashchenko, and M. N. Yakimenko *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 19 Transl. into ENGLISH from Preprint no. 3078, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1983 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

The polarization characteristics of a gamma beam in near perpendicular interaction geometry are investigated as an extension of studies on ruby laser photon scattering by relativistic electrons of the internal beam on the FIAN S-60 synchrotron. A theoretical analysis of the polarization is presented. The direction and degree of polarization of gamma radiation is determined experimentally by exploiting the relationship between the scattering cross section of polarized gamma quanta on the resting electrons of the detector material and the angle betwen the scattering plane and the polarization vector. Measurement of the amplitude and energy spectra are described. The experimental findings provide good qualitative confirmation of the predicted high degree of polarization of the secondary gamma beam caused by interaction between polarized photons and unpolarized relativistic electrons in the perpendicular geometry. It is possible to create quasi-monochromatic gamma beams with the required polarization characteristics that are suitable for physical research if special steps are taken to align the interacting beams and to ensure that the laser can produce pulse energy of at least 10 J over long periods. Author

N86-26127# Joint Publications Research Service, Arlington, Va.
PHYSICAL FACTORS LIMITING SERVICE LIFE OF COPPER BROMIDE LASERS Abstract Only
Nikolay Kirilov Vuchkov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 19 Transl. into ENGLISH from Akademiya Nauk SSSR Institut Obshchey Fiziki Dissertation Abstracts (Moscow, USSR) (For primary document see N86-26108 16-36)
Avail: NTIS HC A05/MF A01

The factors determining the service life of copper bromide lasers are investigated. Six different designs of gas discharge tubes for halogen vapor lasers are developed and tested, each with different placement of the working substance, with or without discharges on limiters, and with differing electrode construction. The nature of the discharge and lasing behavior are studied, and the basic lasing characteristics are measured as a function of the laser operating conditions. Optimum working conditions for the discharge tubes are identified. The behavior of the yellow and green lines is investigated as a function of the working conditions of the copper bromide laser. The main cause for the gradual reduction in laser output power over a time is contamination of the discharge tube output windows. Author

N86-26128# Joint Publications Research Service, Arlington, Va.
TWO-DIMENSIONAL MHD-TURBULENCE: HIERARCHICAL MODEL Abstract Only **c75**
P. G. Frik *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 20-21 Transl. into ENGLISH from Magnitnaya Gidrodinamika (Riga, USSR), no. 3, Jul. - Sep. 1984 p 48-54 Original language document was announced in IAA as A85-11824 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

A hierarchical model of tho dimensional MHD turbulence is proposed which makes it possible to investigate cascade processes over a wide range of wave numbers. The degeneration of MHD turbulence, the behavior of weak magnetic fields under conditions of strong hyrodynamic turbulence, and the developed forced MHD turbulence with various methods of energy input are discussed. The model predictions support some earlier findings concerning the behavior of two dimensional MHD turbulence. It is shown that the established spectral distributions are strongly dependent on the initial conditions and on the method of energy input. V.L.

N86-26129# Joint Publications Research Service, Arlington, Va.
UNSTEADY MHD FLOW IN ANNULAR CHANNEL OF A RADIAL MAGNETIC FIELD Abstract Only **c75**
M. Ya. Antimirov and A. A. Kolyshkin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 21 Transl. into ENGLISH from Magnitnaya Gidrodimanika (Riga, USSR), no. 3, Jul. - Sep. 1984 p 76-78 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

The problem of an unsteady magnetohydrodynamic flow in an annular channel of a radial magnetic field is investigated. The flow of conducting liquid which is fully developed in the direction of the z-axis is investigated with an assigned constant pressure gradient. The problem is stated mathematically in dimensionless quantities (characteristic dimensions of length, time, velocity, magnetic field, and pressure), and is solved by applying the residue theorem. The velocity distribution is plotted for various values of time with different values of the Hartman number. The magnetic field is found to suppress movement and to reduce the rise time. The rise time is plotted as a function of the Hartman number, indicating that the rise time for Ha = 4 is smaller by a factor of 3 than for Ha = 0. The steady state velocity distribution is plotted for different values of the Hartman number. B.G.

N86-26130# Joint Publications Research Service, Arlington, Va.
PLASMA CONFINEMENT IN L-2 STELLARATOR WITH OHMIC HEATING Abstract Only **c75**
I. S. Shpigel *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 23 Transl. into ENGLISH from Fizika Plazmy (Moscow, USSR), v. 11, no. 1, Jan. 1985 p 13-23 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

The results of investigations of ohmic plasma heating in the L-2 stellarator were reviewed. The vacuum structure of the magnetic field ensures plasma equilibrium in the stellarator. Magnetohydrodynamic (MHD) activity occurring in the central portion of the filament has a strong influence on the energy balance in that region. The structure of the MHD oscillations of the plasma in the internal region, and its relationship with the radius of the plasma filament, are established. The primary impurity in the investigated discharges is oxygen, which determines the observed volumetric energy losses, the quantity of Z sub eff, and their radial distributions. No coronal equilibrium was observed experimentally in the plasma, apparently because of the short discharge duration and the small transverse dimension of the plasma filament. The distribution of the ion temperature along the radius, which is asymmetrical because of ion drift in the inhomogeneous magnetic field, is determined throught energy analysis of the atom stream. Author

N86-26131# Joint Publications Research Service, Arlington, Va.
SEPARATION OF U-238 AND Np-237 NUCLEI BY GAMMA-QUANTA INTERMEDIATE ENERGIES Abstract Only **c73**
A. A. Kazakov, G. Ya. Kezerashvili, T. Ye. Lazareva, V. G. Nedorezov, A. N. Skrinskiy, A. S. Sudov, G. M. Tumaykin, and Yu. M. Shatunov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 24 Transl. into ENGLISH from Pisma V Zhurnal Eksperimentalnoy I Teoreticheskoy Fiziki (Moscow, USSR), v. 40, no. 10, 25 Nov. 1984 p 445-447 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

A system employing a beam of backscattered Compton quanta based on the e(+)e(-) accumulating complex and an LTI-701 solid state laser is employed to measure the average photoseparation and separability cross sections of U234 and Np237 nuclei at energies ranging from 150 to 170 MeV. The findings contradict the predictions of existing models based on photon-meson nuclear excitation, and suggest that one of the most probable mechanisms underlying the excitation of nuclei by gamma quanta with intermediate energies, in addition to the photogeneration of pions, is the generation of e(+)e(-) pairs in the field of the

nucleus: the gamma quanta wavelength energies in this region becomes comparable to the nucleon dimension, so that collective nuclear excitations are generally suppressed. Author

N86-26132# Joint Publications Research Service, Arlington, Va.
METEOROLOGICAL CORRECTION TO REFRACTION OF OPTICAL WAVE BEAMS Abstract Only c74
V. P. Lukin, A. E. Melamud, and V. L. Mironov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 27-28 Transl. into ENGLISH from Izvestiya Vysshikh Uchebnykh Zavedeniy: Fizika (Tomsk, USSR), no. 8, Aug. 1985 p 51-56 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

The main source of error in the laser reference systems is the fluctuations of the laser beam axis, due to variations of atmospheric refraction along the propagation path. An error correcting algorithm is proposed which involves calculating the axis displacements in variously stratified air on the basis of meteorological data, rather than tracking the instantaneous positions of special reference sources. Displacement of the center of gravity of the beam cross section is defined as a sum of a regular component and a random component, the latter having a zero mean value and some dispersion. Refinement of the correction algorithm is needed, especially for the intermediate range. The random component of atmospheric refraction is the main source of error. The method is basically sound and can be an aid in the design of laser reference systems for use in specific climatic regions. B.G.

N86-26133# Joint Publications Research Service, Arlington, Va.
APPLICATION OF SCINTALLATION DETECTORS FOR X-RAY DIAGNOSIS OF LASER PLASMA Abstract Only c35
M. P. Kalashnikov, V. K. Lyapidevskiy, Yu. A. Mikhaylov, V. A. Prorvich, A. V. Rode, A. V. Sartori, G. V. Skilzkov, and S. I. Fedotov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 30 Transl. into ENGLISH from Preprint no. 26, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

Scintillation detectors designed to register laser plasma X-radiation in the 2 to 200 keV range are investigated. The filter method is employed, in which the spectral characteristics are a function of the thickness of the filters and the substances used to make them. The X-radiation energies caught by different filters are determined experimentally and used to recover the spectrum. The light yield of surface lasers 0.01 to 20 microns deep is measured. The unit light yield is determined as a function of the absorbed energy density in the 10 to the 17th power to 10 to the 21st power eV/cu cm range, and of the quantum energy for CsJ(T1) crystals (2.6 to 17.4 keV). The use of scintillation detectors for laser plasma X-radiation diagnosis is described. The unit light yield of crystals in the shift X-radiation region is investigated. Measurements of the relationship between the intensity of X-radiation and atomic number of the target in different spectral bands indicates that the distribution of hard quanta is not temperature dependent in the 10 to 100 keV region. Registration of relativistic electrons is analyzed. Because of their small number, these electrons play an insignificant role in the experiments described. Author

N86-26134# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF PERTURBATIONS OF THE SPECTRA OF POLARITON RAMAN SCATTERING OF LIGHT IN NONLINEAR CRYSTALS Abstract Only c74
V. S. Gorelik, L. G. Reznik, and V. S. Umarov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 30 Transl. into ENGLISH from Akademiya Nauk SSSR (Moscow, USSR), Preprint no. 6, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

The influence of temperature, electrical field, and impurity perturbations on the optical and dielectric parameters of nonlinear crystals was examined by polariton Raman scattering of light. The polariton spectra were photographed. The perturbations were effected in the crystals by means of devices developed especially to study crystals under equilibrium and nonequilibrium temperature variation in strong electrical fields with uniaxial pressure. The effect of internal and external perturbations on the crystals changes the nature of the polariton spectra of Raman scattered light. The perturbation effect is greatest for the shift of maximum scattering wavelength on high frequency E-polaritons. The greatest changes are caused by such perturbations as temperature variations, laser radiation and doping. Behavior at maximum wavelengths of polaritons scattering may be used to estimate the values of these parameters. Author

N86-26135# Joint Publications Research Service, Arlington, Va.
LASER RADIATION WAVEFRONT REVERSAL WITH INTERMEDIATE FREQUENCY CONVERSION TO ANOTHER BAND Abstract Only c74
V. I. Bespalov, M. A. Dvoretskiy, A. M. Kiselev, and G. A. Pasmanik *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 31 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2505-2507 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

A laser radiation wavefront reversal method is proposed and implemented experimentally in which the input signal is mixed parametrically with one or several reference wavelengths and translated to a different (intermediate) frequency band where the reversal is performed. Upon passing back through the parametric mixer, the conjugated intermediate frequency signal, together with the conjugated reference wave, produces radiation at the frequency of the input signal. In the experimental setup, light at lambda = 0.5 micron is conjugated by converting it to lambda = 1.06 microns. Neodymium laser radiation was split into two beams, one of which was directed to a KDP crystal, where its frequency was doubled and wavefront reversal performed. After passing through a cuvette containing CuSO4 and plane-parrellel plates, the light beam struck a parametric mixer where it combined with the reference wave. The reference wave or second beam was directed to the same parametric amplifier by a mirror. Parametric frequency mixers can be used effectively for wavefront comjugation of optical signals. The accuracy of the proposed method depends on the characteristics of the parametric mixer, the accuracy of the reference waves wavefront conjugation and the radiation at the intermediate frequency. Author

N86-26136# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF LASER RADIATION ON INDUCED ABSORPTION SPECTRA OF PURE QUARTZ GLASS OPTICAL FIBERS Abstract Only c74
Ye. M. Dianov, V. N. Karpechev, L. S. Korniyenko, A. O. Rybaltovskiy, and P. V.. Chernov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 32 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2480-2486 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

The influence of laser radiation on radiation color centers and their associated induced absorption in the spectra of irradiated glass optical fibers is investigated. The glass fiber specimens employed had 40 to 50 micron diameter cores made of day pure quartz glass. The optical fibers were 6 to 20 meters long, produced by chemical precipitation from the gaseous phase and clad with reflecting borosilicate glass. Spectral measurements of the induced absorption in the ultraviolet region were made using an FEU-71 photodetector and a sounding radiation source. The stimulated laser emission power in the cross section of the optical fiber was measured by a photodiode; the absorption spectra were recorded by the fragment method. Eight different types of color centers were isolated whose bands cover practically the entire observed absorption spectra. The connection found between color centers and a 340 nm absorption band, and color center with absorption in the infrared band, indicate that absorption in the ultraviolet band can have a significant influence on the amount of induced absorption in the infrared band. Author

N86-26137# Joint Publications Research Service, Arlington, Va.
ANALYSIS AND INVESTIGATION OF A COHERENT WAVEFIELD IN THE FOCAL REGION OF RADIAL-SYMMETRIC OPTICAL ELEMENTS Abstract Only **c74**
A. G. Vasin, M. A. Golyo, V. A. Danilov, N. L. Kazanskiy, S. V. Karpeyev, I. N. Sisakyan, V. A. Soyfer, and G. V. Uvarov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 34 Transl. into ENGLISH from Preprint no. 304, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1983 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

A method is proposed for calculating the coherent wavefield in the focal region of computer simulated radial symmetric optical elements. The problem of defining the area of applicability of geometric optics in design focusers, as well as the influence of digitization errors on the functioning of artificial optical elements were studied. Computation of the three dimensional intensity distribution of focused radiation in the focal region using wave theory is examined for the case of radial symmetric optical elements. An algorithm and program are described for calculating the light field in the focal region of the focuser. The results of computer calculations are outlined. The experimental investigation of a focuser in a thin cylinder is described. The calculated light intensity distribution in the cross sections of the focal region agree with the experimental investigation of the laser radiation focuser in a thin cylinder. The methods can be used effectively for computer modeling of the laser radiation focused by a synthetic radial symmetric optical element. Author

N86-26138# Joint Publications Research Service, Arlington, Va.
CORRELATION PROPERTIES OF OPTICAL FIELDS Abstract Only **c74**
V. P. Vykov and G. V. Shepelev *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 35 Transl. into ENGLISH from Preprint no. 149, Institut Obshchey Fiziki, Laboratoriya Volnovykh Yavleniy, Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

Interference experiments in classical and quantum electrodynamics were described. Different methods are discussed for statistical processing of measurements results, as well as the relationship between statistical processing and quantum mechanical averaging. The influence of the quantum state of the electromagnetic field on the interference result is examined. Fourth order interference experiments are discussed. The results of interference experiments with independent beams depend upon the quantum mechanical state of the electromagnetic field, which allows such experiments to be used to investigate the state of the field. Experiments on fourth order coherence are found to differ qualitatively from second order experiments, and provide additional information on the quantum mechanical state of the investigated field. Author

N86-26139# Joint Publications Research Service, Arlington, Va.
PLASMA-EMISSION ENERGY CONVERSION Abstract Only **c75**
I. V. Kirsanov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 37 Transl. into ENGLISH from Preprint no. 41, Institut Obshchey Fiziki an SSSR. Fizika Plazmy, Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

A method for converting plasma thermal energy to electrical energy is investigated. A plasma heated by an external source is in contact with electrodes having different emission properties. As a result, a potential difference occurs between the electrodes, and when the circuit is closed through the load resistance current can flow. The possibility of plasma emission conversion is demonstrated by the example of a single unidimensional system. It is found analytically that maximum efficiency is achieved by reducing the emission from the collector electrode; by the same token, increasing the emission from the emitting electrode above a certain value does not improve the efficiency of the converter. Energy applied asymmetrically from the external source increases conversion efficiency if the electrons moving to the collector electrode have more energy than the electrons moving toward the emitter. The findings agree well with experimental results, and can be used to assess the possibility of forming a virtual cathode during strong emission from the electrode and calculating the current density after such a cathode is formed. Author

N86-26140# Joint Publications Research Service, Arlington, Va.
CYCLOTRON ABSORPTION OF A FAST MAGNETOSONIC WAVE IN A STELLARATOR Abstract Only **c75**
L. M. Kovriznhykh and P. Ye. Moroz *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 38-39 Transl. into ENGLISH from Preprint no. 120, Institut Obshchey Fiziki an SSSR. Fizika Plazmy, Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

Amplification of cyclotron absorption of a fast magnetosonic wave heated at cyclotron frequency of fundamental plasma ions is investigated. It is shown that the occurrence of bounce resonance causes interference among the contributions from different resonance angles. Expressions are derived for the absorbed power that makes it possible to judge the intensification of absorption. The intensification of absorption in a stellarator is caused by the spiral nature of the confining magnetic field. An expression is derived for the plasma currents in the stellarator magnetic field, and for the average power per unit volume of plasma absorbed on a given magnetic surface. Absorption in the absence of bounce resonance is analyzed. The wavefields near the resonant angles are found using Maxwell's equations. A mechanism is presented which accounts for the intensified absorption of fast magnetosonic waves in the L-2 stellarator at the cyclotron frequency of the fundamental ions of the plasma. Author

N86-26141# Joint Publications Research Service, Arlington, Va.
SUPERRADIANCE IN AN UNDULATOR IN DUAL RESONANCE MODE Abstract Only **c75**
L. S. Bogdankevich, L. K. Gelkhviidze, V. S. Ivanov, S. I. Krementsov, M. D. Rayzer, A. A. Rukhadze, and A. V. Fedotov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 39 Transl. into ENGLISH from Preprint no. 151, Institut Obshchey Fiziki an SSSR: Fizika Plazmy, Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

The emission of a relativistic electron beam in a linearly polarized undulator magnetic field is investigated experimentally and theoretically. The Terek-I high current accelerator was employed as the electron beam injector. A spatially periodic magnetic field was formed by a system of copper rings within the external pulse magnetic field. The resonance conditions for the longitudinal and transverse components of the magnetic field are investigated. Current transmission is found to be strongly dependent on the angle between the axis of the undulator and the axis of the solenoid. A system of equations is derived for the movement of a relativistic electron in the magnetic field of the undulator. The experimentally observed values of the resonant longitudinal magnetic field, the width of the resonant region, the transverse velocity of the electrons, and the radiation line width are explained analytically. Author

N86-26142# Joint Publications Research Service, Arlington, Va.
TWO-DIMENSIONAL PLASMA FLOWS IN A CURRENT LAYER ACCORDING TO RESULTS OF SPECTRAL MEASUREMENTS Abstract Only **c75**
N. P. Kirty, V. S. Markov, M. M. Savchenko, and A. G. Frank *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 40 Transl. into ENGLISH from Preprint no. 193, Institut Obshchey Fiziki an SSSR. Fizika Plazmy, Academy

of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

The average ion energies and velocities of two dimensional plasma currents are investigated at different current layer evolution stages by analyzing the profiles of spectral lines broadened due to the Doppler effect. The space-time characteristics of plasma glow in different atom and ion lines are investigated. Two dimensional plasma currents are found to occur in the vicinity of the current layer, as well as within the layer, in argon. The spatial distribution of the glow in different helium spectral lines, and its time dependence, indicate that the current layer is a region of elevated electron temperature. The effective ion temperature in the layer is found, and its dynamics over time is investigated in different modes. The ion temperature comprises 20 to 200 eV, depending upon the type of gas and other experimental conditions. Author

N86-26143# Joint Publications Research Service, Arlington, Va.
RADIATION SUPERCOOLING OF BULK-IONIZED PLASMA OF MULTIPLY CHARGED IONS Abstract Only c75
F. V. Bunkin, V. I. Derzhiyev, S. A. Mayorov, and S. I. Yakovlenko *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 41 Transl. into ENGLISH from Preprint no. 221, Institut Obshchey Fiziki, Laboratoriya Volnovykh Yavleniy, Academy of Sciences (USSR), Moscow, USSR, 1984 221, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

The possibility of creating a supercooled plasma of multiply-charged ions obtained by exposing an optically thin medium to radiation from an external photon source with Planck spectrum is investigated. The plasma considered exhibits bulk losses; the ionization balance and corresponding radiation characteristics are calculated in each case for the nonequilibrium situation. The cases of stationary and expanding plasmas are analyzed. Photorecombination radiation is found to be the main cooling channel in stationary, as well as expanding, plasma. The photorecombination cooling rate is governed by the efficiency of thermal ionization of the recombined ion. Thermal ionization becomes less inefficient, and the plasma temperature increases accordingly, as the most represented ions shift from Li to He and H-like. The expansion cooling is minor in these cases, with expansion influencing the plasma temperature mainly through a shift in the charge composition which accompanies the drop in density for a given stream of ionizing particles. Significant gain, which can exist for several nanoseconds, is achieved at the 4 to 3 hydrogen-like ion transition in the forming plasma. Author

N86-26144# Joint Publications Research Service, Arlington, Va.
AMPLIFICATION OF LIGHT AT H-ION TRANSITIONS DURING FREE EXPANSION OF THIN CYLINDRICAL PLASMOIDS (ADIABATIC EXPANSION) Abstract Only c75
A. V. Borovskiy, V. V. Korobkin, and Ch. K. Mukhtarov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 42 Trans. into ENGLISH from Priprint no. 157, Institut Obshchey Fiziki, Laboratoriya Volnovykh Yavleniy, Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

A new method is proposed for theoretical analysis of the dynamics of the gain at H-ion transitions during expansion in a vacuum of thin cylindrical plasmoids that have been heated to a state of total ionization. The approach is used to investigate the gains in an adiabatically expanding plasma, disregarding bremsstrahlung losses that cool the electron gas, and the release of recombination heat. The maximum gains that can be achieved during the expansion of these plasmoids are found. The best initial temperature or plasmoid density values are found for which the maximum gains are realized. Formulas describing adiabatic expansion are provided for reference. For adiabatic plasma expansion, the problem consists of investigating the gain as a function of three variables; time, and two parameters that are algebraic combinations of the radius, and the nucleus charge. If some quantities are varied and some are held constant, the gain reaches its maximum as a function of two variables. Author

N86-26145# Joint Publications Research Service, Arlington, Va.
BRANCHES OF THERMAL PHYSICS AND APPLICATIONS DISCUSSED Abstract Only c75
S. Kutateladze *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 44 Transl. into ENGLISH from NTR: Problmy i Resheniya (Moscow, USSR), 2-15 Jul. 1985 p 6 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

The objects of study of thermal physics are discussed which became established as a scientific direction in the 1950s and in the 1960s. Phenomena are investigated which involve complex interactions of thermodynamic processes in all aggregate states of matter. The following branches of thermal physics are briefly discussed and their applications are characterized: transport theory, and theory of transport and caloric properties of substances; heat engineering; mechanics of gas-liquid systems; nonequilibrium thermal gas dynamics; cryohydrodynamics; dynamics of thermal plasma. E.R.

N86-26146# Joint Publications Research Service, Arlington, Va.
MICROCHANNEL ANALYZER FOR RECORDING PARTICLE AND X-RAY EMISSION FROM LASER PLASMA Abstract Only c35
L. Z. Barabash, B. N. Bragin, A. A. Golubev, A. I. Gromov, Yu. A. Zakharenkov, V. S. Malysheva, A. I. Nikitenko, A. F. Nikitina, G. V. Ryazanov, and R. T. Khaydarov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 45 Transl. into ENGLISH from Kratkiye Soobshcheniya po Fizike (Moscow, USSR), no. 5, May 1985 p 16-20 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

A microchannel analyzer was developed for recording the emission of particles and X-rays from a laser plasma. It consists of several camerae obscurae facing the target, some open for recording ions and some covered by beryllium or aluminum filters for recording soft and hard X-radiation, a microchannel plate behind the cameras which converts X-radiation or ion flux into an electron flux, and a fiber optic plate behind the microchannel plate with an aluminized luminescent coating for conversion of the electron flux into visible radiation. The analyzer was calibrated against an MIR-3 X-ray microscope operating in the continuous mode for sensitivity to hard X-radiation and against a plasma pulse source generated by a CO_2 laser in a solid lead target for sensitivity to soft X-radition. The calibration includes flux amplification versus plate voltage, relative flux yield versus filter thickness, absolute flux yield versus amplitude of input signal, with filter material and filter thickness, distance from target to camera obscura and distance from camera obscura to microchannel plate, voltage across microchannel plate, and voltage between microchannel plate and fiber optic plate being adjustable parameters of the instrument. Author

N86-26147# Joint Publications Research Service, Arlington, Va.
MAGNETIC ANALYZER OF HIGH-ENERGY IONS FROM THERMONUCLEAR TARGETS COMPRESSED BY LASER BEAM Abstract Only c35
A. A. Yerokhin, Yu. A. Zakharenkov, G. V. Sklizkov, and A. S. Shikanov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 46 Transl. into ENGLISH from Kratkiye Soobshcheniya po Fizike (Moscow, USSR), no. 5, May 1985 p 21-24 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

A magnetic mass spectrograph was built for spectral analysis of protons produced by the D-D reaction and of high energy hydrogen ions accelerating through the rarefied corona of the laser plasma on a compressed target. Its design is based on the principle of ideal focusing, which can be maintained even with wide entrance slits. The distance from target to analyzer is 1.5 m, and the solid angle covered is of the order of .00001 sr or approximately 10 times larger than that covered by earlier built mass spectrographs. The design and the performance of this instrument are in

accordance with proton and ion ballistics and energy distributions during compression, ablation, and evaporation. The analyzer geometry and ion optical characteristics conform to structural features of and operating conditions in the Delfin experimental laser facility. The magnetic field is produced by an electromagnet with cylindrical core 225 mm in diameter and two face plates. Heterogeneity of the magnetic field below 100 mT intensity limits the resolving power of the instrument. Microchannel plates operating in the current amplifier mode can also be used as high sensitivity track detectors. Author

N86-26148# Joint Publications Research Service, Arlington, Va.
HYDRODYNAMICS OF PLASMA COMPRESSION WITH A MAGNETIC FIELD BY A THIN CYLINDRICAL WALL Abstract Only c75
A. L. Velikovich, S. M. Golberg, M. A. Liberman, and F. S. Felber *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 47 Transl. into ENGLISH from Zhurnal Eksperimentalnoy i Teoreticheskoy Fiziki (Moscow, USSR), v. 88, no. 2, Feb. 1985 p 445-459 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

The hydrodynamic characteristics of a plasma with a magnetic field are investigated theoretically in the case of compression by a thin cylindrical wall. Solutions are obtained for a series of self similar equations which describe the compression of the plasma by the cylindrical wall, and the structure of the plasma boundary layer near the wall. It is shown that the formation of the boundary layer heat fluxes and thermomagnetic currents in the boundary layer can lead to an increase in the diagmagnetism of the plasma. Magnetic flux losses due to compression in a plasma with classical transport coefficients may increase significantly, and may reach values for a turbulent plasma. At moderate rates of compression such as those observed experimentally, magnetic flux losses are found to be small. Numerical calculations of the radial compression of a plasma by a cylinder are found to agree with the self similar solutions. Profiles of the magnetic field under compression by the cylinder are given for different equations of state for the specific heat, conductivity, and compressibility of the cylinder wall. I.H.

N86-26149# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF CURRENT GENERATION BY LOWER HYBRID WAVES IN A T-7 TOKAMAK Abstract Only c75
V. V. Alikayev, Yu. V. Grozdkov, Y. Dyatlov, F. Zhachek, D. P. Ivanov, N. V. Ivanov, V. I. Ilin, A. M. Kakurin, A. Ya. Kislov, and R. Klima *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 48 Transl. into ENGLISH from Fizika Plazmy (Moscow, USSR), v. 11, no. 1, Jan. 1985 p 53-61 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

Experimental results of the generation of current in the T-7 tokamak are presented. Analysis indicates that the main cause of the loss of directional movement energy by electrons during the generation of current by lower hybrid waves is coulomb collision. In order to generate current which significantly exceeds the level predicted by quasi-linear theory, more complex nonlinear processes of interactions between lower hybrid waves and plasma must occur. The current density profile changes significantly when high frequency power is injected into a plasma. This probably also caused the increase observed in the diffusion lifetime of the plasma. Author

N86-26150# Joint Publications Research Service, Arlington, Va.
LASER-DRIVEN X-RAY EMISSION FROM A PLASMA FOCUS Abstract Only c75
V. A. Gribkov, S. Denus, A. V. Dubrovskiy, A. I. Isakov, N. V. Kalachev, O. N. Krokhin, V. Ya. Nikulin, S. Sledzinskiy, and S. Chekay *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 50 Transl. into ENGLISH from Fizika Plazmy (Moscow, USSR), v. 11, no. 1, Jan. 1985 p 117-122 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

When the anode of a plasma focus is bombarded by an intense laser beam before the hard radiation appears, the pulse shape and spectrum of the X-rays change because of an increase in the number of particles in the cross section and an increase in the effective charge of the pinch plasma due to the injection of multiply charged copper ions into the contraction region. The pinch region and the generation of hard radiation are detected near the laser focus. Author

N86-26151# Joint Publications Research Service, Arlington, Va.
PROGRESS IN CONTROLLED FUSION RESEARCH DESCRIBED c75
L. Sorin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 51-52 Transl. into ENGLISH from Moskovskaya Pravda (Moscow, USSR), 24 Nov. 1985 p 2 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

Some comments on controlled fusion by a Soviet scientist are presented. His thoughts on the problem of thermonuclear power engineering are: Two approaches to the solution of the problem of fusion can be seen. One of them involves the use of strong magnetic field and superconductivity. This approach is being pursued with tokamak devices by scientist of the Department of Plasma Physics and Stationary Controlled Fusion Systems. The second approach is the method of microexplosions, which is being developed at the USSR Academy of Sciences. The tokamak concept, which has now spread to laboratories throughout the world and, it is generally agreed, is the most fully studied aspect of the complex problem of controlled fusion, was formulated and advanced in the USSR. E.R.

N86-26152# Joint Publications Research Service, Arlington, Va.
MOVING SOLITONS IN SUPERCONDUCTORS AND PEYERLS SYSTEMS Abstract Only c76
S. V. Panyukov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 53 Transl. into ENGLISH from Kratkiye Soobshcheniya po Fizike (Moscow, USSR), no. 5, May 1985 p 56-59 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

An exact solution to the problem of moving solitons in anisotropic superconductors and in Peyerls systems is obtained by the method of reduction to the reverse problem of scattering, which has already yielded exact quiescent soliton solutions. Metals with almost plane segments of the Fermi surface are considered, and that surface is assumed to have the form of a parallelepiped. The equilibrium value of the order parameter is determined from the effective soliton action in terms of scattering parameters of the electronic subsystem and electron-proton interaction parameters, with the aid of quasi-classical Green functions integrated with respect to the energy variable. The order parameter for a single domain wall and a charged polaron is then calculated, assuming first a quiescent soliton, whereupon the surface energy of a domain well is found by a Legendre transformation of the soliton action. Complete integrability with respect to time makes it possible to obtain an exact moving soliton solution, in the absence of pinning by structural defects. Author

N86-26153# Joint Publications Research Service, Arlington, Va.
TEMPERATURE DIAGNOSIS OF A MIXTURE OF MOLECULAR GASES HEATED BY CW CO-2 LASER Abstract Only c34
R. Aleksandresku, F. V. Bunkin, B. S. Luklyamchuk, Y. Mikhaylesku, Ye. A. Morozova, and G. A. Shafeyev *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 54 Transl. into ENGLISH from Preprint no. 223, Institut Obshchey Fiziki, Laboratoriya Volnovykh Yavleniy, Academy of Sciences (USSR), Moscow, USSR, 1984 Preprint no. 223, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

A method is proposed for measuring the temperature of a gas mixture heated by CW radiation from a CO2 laser, in the zone of radiation operation based on information contained in the radiation spectra of the gas mixture. The radiation spectra of heated mixtures of SF6 and molecular gases (ammonia, xenon, helium,

and air) are observed experimentally. It is demonstrated that the temperature of the gas mixture in the laser interaction region can be recovered from these thermal radiation spectra. It is also possible to determine the temperature conductivity and the heat conduction, as well as the partial pressure of each of the components of the mixture. The thermal spectra contain information on the dynamics of the nonequilibrium thermochemical processes occurring in the gaseous phase and make it possible, inter alia, to identify intermediate reaction products. Author

N86-26154# Joint Publications Research Service, Arlington, Va.
NONLINEAR PROPAGATION OF SPATIALLY BOUNDED TRANSVERSE WAVES THROUGH ISOTROPIC SOLID MEDIUM c77
Ye. A. Zabolotskaya *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 58-59 Transl. into ENGLISH from Kratkiye Soobshcheniya po Fizike (Moscow, USSR), no. 6, Jun. 1985 p 43-47 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

Nonlinear propagation of spatially bounded transverse waves through an isotropic solid medium is analyzed, assuming only synchronous interaction of transverse and longitudinal waves with attendant cumulative effect. From the fundamental stress-tensor displacement vector equation describing the propagation of elastic waves through an isotropic medium with dissipation and viscosity is, accordingly, derived an equation describing the nonlinear propagation of quasiplane transverse waves through such a medium. This equation is a third order approximation, since no distortion of plane transverse waves appears in the second order approximation. After explication into a system of equations in the displacement components in a system of slow coordinates, and subsequent elimination of the longitudinal displacement component, it is reduced to a system of equations of third order smallness with respect to displacement perturbations. The quadratic mode in these equations vanishes for waves with linear, circular, or elliptic polarization so that a quadratic nonlinearity does not generate a second harmonic directly. Author

N86-26155# Joint Publications Research Service, Arlington, Va.
TWO TYPES OF NONLINEAR OPTICAL SUSCEPTIBILITY Abstract Only c74
An. V. Vinogradov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 60 Transl. into ENGLISH from Preprint no. 42, Lebedev Physcial Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

The existence of two different types of terms in the expansion by powers of the polarization field is investigated. The concept of dynamic and kinetic nonlinear optical susceptibilities is introduced. The nonlinear optical susceptibities are obtained by expanding the density matrix of a system consisting of a substance and an electromagnetic field into a perturbation theory series with respect to the interaction between them. Dynamic susceptibilities are associated with the regular terms of such a series for the dynamic time reversible equation for the density matrix. Kinetic deceptibility, on the other hand, is associated with the diverging, secular terms of that series. An exposition of perturbation theory is given in a form that makes it possible to calculate both types of nonlinear optical susceptibilities. An example is given of the derivation of the balanced kinetic equation, which can be extended to the case in which perturbation theory includes divergences caused by the occurrence of resonance, in addition to secular divergences. The occurrence of resonance makes it possible to isolate a certain class of patterns, and thus to close the system of renormalization equations. Author

N86-26156# Joint Publications Research Service, Arlington, Va.
COMPUTERIZATION DEMANDS ADVANCED MATHEMATICAL MODELING Abstract Only c63
A. A. Samarskiy *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 62-64 Transl. into ENGLISH from NTR: Problemy i Resheniya (Moscow, USSR), no. 5, 16 Jul. - 3 Aug. 1985 p 1; 4-5 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

The importance of advancing computer mathematics and mathematical modeling is discussed. A certain tendency to divorce questions of mathematical modeling from problems of the development of computer technology is noted. The results are that the pace of development of computer mathematics is lagging behind that of computer technology. Computer experiments, their methodology, and how they can help to solve problems in various fields of science and technology are also discussed. The state of mathematical modeling and its application is assessed, and what needs to be done to improve it is explored. It is stated that there is a need to create libraries of standard algorithms on a new methodological base, as well as packages of applied programs for various classes of problems. E.R.

N86-26157# Joint Publications Research Service, Arlington, Va.
SOME THEORY OF APPROXIMATION AND NUMERICAL ANALYSIS PROBLEMS Abstract Only c64
K. I. Babenko *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 65 Transl. into ENGLISH from Uspekhi Matematicheskikh Nauk (Moscow, USSR), v. 40, no. 1 (241), Jan. - Feb. 1985 p 3-28 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

A number of approximation theory problems that are important in numerical analysis are formulated. Different methods for digitizing functional compacts are examined, and optimum methods are identified. Certain approximation theory problems for functions of finite smoothness are examined. Construction of nonsaturating numerical algorithms is investigated. Approximation of infinitely differentiable classes of functions is explained. The role of modern computer speed and memory capacity is discussed as related to general problems of digitizing functional compacts. Author

N86-26158# Joint Publications Research Service, Arlington, Va.
FAST ALGORITHM FOR SOLVING A NETWORK DISTRIBUTION PROBLEM AND ITS APPLICATION Abstract Only c64
K. V. Kim and O. V. Ni *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 66 Transl. into ENGLISH from Izvestiya Akademii Nauk Kazakhskoy SSR. Seriya Fiziko-Matematicheskaya (Alma Ata, USSR), no. 1 (122), Jan. - Feb. 1985 p 87-89 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

An algorithm is proposed for solving a network distribution problem based on a procedure described in a previous study. In solving the network distribution problem, a reference plane is first constructed, and potentials are computed for it, after which the optimality condition is checked and a candidate list is drawn up. The coefficients of the change in the amount of traffic are then computed for each communication from the candidate list, and a decision is made about whether to add a given communication to the basis or not. The algorithm is much faster than ordinary implementation of the generalized method of potentials, making it especially effective for models that converge to a solution for a series of distribution problems. Author

N86-26159# Joint Publications Research Service, Arlington, Va
PRINCIPLES OF MULTIVARIANT DOMINATION IN OPTIMUM CONTROL OF TECHNOLOGICAL PROCESSES Abstract Only c63
E. M. Aliyev *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 68 Transl. into ENGLISH from Izvestiya Akademii Nauk USSR. Seriya Tekhnicheskikh Nauk (Tashkent, USSR), no. 6, Nov. - Dec. 1984 p 6-10 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

A method is proposed for selecting optimum solutions for technological processes with predictive quality indicators. The concept of preference distribution of acceptable variants, optimiza-

tion model of multivariant domination, and multivariant domination distribution with respect to the optimization model are introduced. Four principles are cited for optimization models of multivariant domination. The definitions and principles introduced make it possible to adequately select and describe a prediction procedure and optimal control algorithm for technological processes with predictive quality indicators. Author

N86-26160# Joint Publications Research Service, Arlington, Va.
SIMULATION PROBLEM OF CONTROLLING LATERAL MOVEMENT OF AIRCRAFT DURING LANDING APPROACH Abstract Only **c63**
N. D. Botkin, V. M. Keyn, and V. S. Patsko *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 69-70 Transl. into ENGLISH from Prikladnaya Matematika i Mekhanika (Moscow, USSR), v. 48, no. 4, Jul. - Aug. 1984 p 560-567 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

The problem of controlling lateral movement of an aircraft in the final phase of landing under windy condition is investigated. A vector differential equation is derived to describe the lateral movement of an aircraft in linear approximation. The problem is formalized as an antagonistic positional differential close-end game between two players with a convex payoff function. The controlling parameter of the first player is a scalar, so that a universal stable optimum strategy exists for the first player. The movements of the initial system of equations are modeled for the initial conditions of one of the parameters at the moment T sub o = 0. It is found that a linear control principle does not guarantee a successful landing approach under extreme perturbation, but that a combined method does provide such a guarantee. Linear control likewise does not guarantee a successful landing in the absence of extreme perturbations if initial deviations, which the combined control principle can handle, are large. Author

N86-26161# Joint Publications Research Service, Arlington, Va.
PARAMETRIC OPTIMIZATION OF ALGORITHM FOR ESTIMATING VALUES OF ONE CLASS OF UNSTEADY RANDOM PROCESSES Abstract Only **c66**
G. A. Kryzhanovskiy and V. I. Aleshin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 71 Transl. into ENGLISH from Izvestiya Akademii Nauk Kazakhskoy SSR: Seriya Fiziko-Matematicheskaya (Alma Ata, USSR), no. 5, Sep. - Oct. 1984 p 77-81 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

Optimization of the measurement processing algorithm employed in automated air traffic control systems is investigated with respect to such observation parameters as the number of measurements processed, the digitization interval and the weighted coefficients of the algorithm. The longitudinal and lateral components of the ground speed vector are calculated by the least squares method, using a linear approximation function. The variance of the approximating function in the region of the airport is defined as the efficiency indicator in the problem of parametric optimization of the traffic control algorithm. The approach employed makes it possible to make maximum use of the capabilities of existing automated air traffic control systems and to improve ground speed determination accuracy. Author

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution.*

N86-26162*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXPERIMENTAL STUDY OF THE EFFECTS OF INSTALLATION ON SINGLE AND COUNTER-ROTATION PROPELLER NOISE
F. J. W. Block Apr. 1986 33 p refs Original contains color illustrations
(NASA-TP-2541; L-16046; NAS 1.60:2541) Avail: NTIS HC A03/MF A01 CSCL 20A

Measurements which are required to define the directivity and the level of propeller noise were studied. The noise radiation pattern for various single-rotation (SR) propeller and counter-rotation (CR) propeller installations were mapped. The measurements covered + or - 60 deg from the propeller disk plane and + or - 60 deg in the cross-stream direction. Configurations examined included SR and CR propellers at angle of attack and an SR pusher installation. The increases in noise that arise from an unsteady loading operation such as an SR pusher or a CR exceeded 15 dB in the forward axial direction. Most of the additional noise radiates in the axial directions for unsteady loading operations of both the SR pusher and the CR tractor. E.A.K.

N86-26163*# Cornell Univ., Ithaca, N.Y. School of Mechanical and Aerospace Engineering.
HELICOPTER TAIL ROTOR NOISE ANALYSES Final Technical Report, 1 Jun. 1985 - 31 Jan. 1986
Albert R. George and S.-T. Chou Jan. 1986 66 p refs
(Grant NAG1-590)
(NASA-CR-176829; NAS 1.26:176829) Avail: NTIS HC A04/MF A01 CSCL 20A

A study was made of helicopter tail rotor noise, particularly that due to interactions with the main rotor tip vortices, and with the fuselage separation mean wake. The tail rotor blade-main rotor tip vortex interaction is modelled as an airfoil of infinite span cutting through a moving vortex. The vortex and the geometry information required by the analyses are obtained through a free wake geometry analysis of the main rotor. The acoustic pressure-time histories for the tail rotor blade-vortex interactions are then calculated. These acoustic results are compared to tail rotor loading and thickness noise, and are found to be significant to the overall tail rotor noise generation. Under most helicopter operating conditions, large acoustic pressure fluctuations can be generated due to a series of skewed main rotor tip vortices passing through the tail rotor disk. The noise generation depends strongly upon the helicopter operating conditions and the location of the tail rotor relative to the main rotor. Author

N86-26164# Naval Postgraduate School, Monterey, Calif.
MEASUREMENT OF THE ACOUSTIC PRESSURE EVERYWHERE OVER A MODELED CONTINENTAL SLOPE M.S. Thesis
John A. Borchardt Dec. 1985 79 p refs
(AD-A164126) Avail: NTIS HC A05/MF A01 CSCL 20/1

An image model was used to predict the sound pressure field everywhere within isospeed water overlying a sloping absorbing bottom. All lengths scale with the dump distance, which is the distance from the apex of the wedge to the point where the depth is equal to the minimum uniform depth that can support propagation of the lowest normal mode. Measurements made in a laboratory tank with a 9.5 deg. sand bottom with density and speed of sound 2.0 and 1.1 times those of water showed qualitative agreement with the predictions of the model for receiver distances up to 10 dump distances from the apex and 50 dump distances along the shore. GRA

N86-26165# Sierra Geophysics, Inc., Redmond, Wash.
THREE-DIMENSIONAL WAVE PROPAGATION USING BOUNDARY INTEGRAL EQUATION TECHNIQUES Technical Report, May 1984 - May 1985
Randy J. Apsel, George R. Mellman, and Ping C. Wong Sep. 1985 56 p refs
(Contract N00014-84-C-0104; AF Proj. 2309)
(AD-A164498; SGI-R-85-120; AFGL-TR-85-0245; SR-1) Avail: NTIS HC A04/MF A01 CSCL 20/1

The efficient numerical propagation of waves in complex three-dimensionally varying environments has been a problem of considerable geophysical interest over the past few years, yet has proven extremely difficult even for the case of acoustic wave propagation in two dimesional structures. This is primarily due to the fact that although the differential equations of motion are linear in the field quantities of interest, they are non-linear in terms of the boundary conditions for most realistic structures. This funda-

mental nonlinearity precludes construction of the solution for complex structures by superposition of the solutions for simple structures, and forces one into computationally costly schemes. Techniques for dealing with this fundamental nonlinearity have spanned the range from the crudest classical ray tracing approach to the computational-bound finite difference type methods. However, no single technique has ever proven entirely satisfactory for reasons of accuracy, completeness of solution, generality of application, cost or combinations thereof. For example, in cases where significant diffraction and interference effects require exact solutions, finite difference techniques have received widespread use. GRA

N86-26166# Georgia Inst. of Tech., Atlanta.
APPLICATION AND EXTENSION OF AN ANALYTICAL MODEL OF THE CONFINED ACOUSTIC BEAM GENERATED BY A TRANSDUCER Final Report
Jerry H. Ginsberg Oct. 1985 251 p refs
(Contract N00014-82-K-0366)
(AD-A164514) Avail: NTIS HC A12/MF A01 CSCL 20/1

Numerous evaluations of the acoustic field radiating from a baffled transducer have appeared in the published literature. An important feature is that these theories are applicable for a wide range of parameters. Approximations, such as those describing an axisymmetric sound beam in the far field (Fraunhofer zone) can substantially reduce computational cost, but they are not necessary. Linear theory is valid when the source level is sufficiently low. Even then, diffraction effects in the near field, which lead to localized cancellations and reinforcements, complicate the task of correlating near field measurements to far field propagation properties. The primary goal of this project was to develop an analytical description of transducer radiation in which finite amplitude effects, diffraction, and spherical spreading are treated consistently, without limitation to a specific spatial domain. The technique employed singular perturbation theory in conjunction with asymptotic analysis. GRA

N86-25587# Joint Publications Research Service, Arlington, Va.
SOLUTION TO PROBLEM OF TRANSIENT DIFFRACTION OF ACOUSTIC WAVES BY INFINITELY LONG OPEN SHELLS Abstract Only
V. V. Dykhta *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 78 Transl. into ENGLISH from Doklady Akademii Nauk Ukrainskoy SSR, Seriya A: Fiziko-Matematicheskiye i Teknicheskiye Nauki (Kiev, USSR), no. 11, Nov. 1984 p 33-35 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25588# Joint Publications Research Service, Arlington, Va.
SOUND ISOLATION IN WIDE CYLINDRICAL TUBE WITH ANNULAR GROOVES IN WALL Abstract Only
P. V. Kuznetsov and G. S. Nosko *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 80 Transl. into ENGLISH from Akusticheskiy Zhurnal (Moscow, USSR), v. 30, no. 3, May - Jun. 1984 p 395-396 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25589# Joint Publications Research Service, Arlington, Va.
HYDRODYNAMIC INTERACTION OF TWO SPHERICAL PARTICLES CAUSED BY SOUND WAVE PROPAGATING ALONG CENTER-TO-CENTER LINE Abstract Only
A. P. Zhuk *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 81 Transl. into ENGLISH from Priklaknaya Mekhanika (Kiev, USSR), v. 20, no. 9, Sep. 1984 p 111-116 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

N86-25840*# Naval Ship Research and Development Center, Bethesda, Md. Numerical Structural Mechanics Branch.
CALCULATING FAR-FIELD RADIATED SOUND PRESSURE LEVELS FROM NASTRAN OUTPUT
Robert R. Lipman *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium May 1986 p 282-292 refs Original contains color illustrations (For primary document see N86-25823 16-71)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

N86-25841*# Naval Ship Research and Development Center, Bethesda, Md. Numerical Mechanics Div.
A GENERAL LOW FREQUENCY ACOUSTIC RADIATION CAPABILITY FOR NASTRAN
G. C. Everstine, F. M. Henderson, E. A. Schroeder, and R. R. Lipman *In* Computer Software Management and Information Center Fourteenth NASTRAN Users' Colloquium 1986 p 293-310 refs (For primary document see N86-25823 16-39)
Avail: NTIS HC A15/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N86-26167# Abilene Christian Univ., Tex.
MEASUREMENTS OF OBSERVABLES OF PION-NUCLEON REACTIONS Progress Report
M. E. Sadler 20 Mar. 1985 105 p
(Contract DE-AS05-81ER-40036)
(DE85-011778; DOE/ER-40036/4) Avail: NTIS HC A06/MF A01

This document reports the progress of the research of pion reactions. These include (1) a study to measure observables in the pion-nucleon system in the momentum interval 400 to 700 MeV/c, (2) differential cross section measurements at low energy for pion-nucleon charge exchange, and (3) elastic and inelastic scattering of (PI)(+-) on H-3 and He-3. Individual experiments are indexed separately. DOE

N86-26168# California Univ., Berkeley. Lawrence Berkeley Lab.
MEASUREMENT OF INTERACTION CROSS SECTIONS AND NUCLEAR RADII OF UNSTABLE P-SHELL NUCLEI
I. Tanihata Sep. 1985 17 p refs Presented at the TRIUMF Accelerated Radioactive Beams Workshop, Vancouver, British Columbia, 5-7 Sep. 1985 Prepared in cooperation with Tokyo Univ., Tanashi
(Contract DE-AC03-76SF-00098)
(DE86-002898; LBL-20245; CONF-8509148-3) Avail: NTIS HC A02/MF A01

Secondary beams of p-shell nuclei (both stable and unstable) have been produced through projectile fragmentation of high energy heavy ion collisions. Interaction cross sections (sigma/sub I/) for all the known He and Li isotopes and /sup 7, 9, 10/Be isotopes on targets Be, C, and Al have been measured at 790 MeV/nucleon. Root-mean-square radii of these isotopes were deduced from the sigma/sub I/. The differences of matter radii among isobars (He-6Li-6, He-8Li-8, and Li-9Be-9) were observed for the first time. A pair of mirror nuclei (Li-7Be-7) shows an equal radii. The radius of Li-11 was found to be considerably larger than those of neighboring nuclei. DOE

N86-26169# Argonne National Lab., Ill.
STRUCTURE FUNCTIONS OF NUCLEI IN THE PION EXCHANGE MODEL
E. L. Berger and F. Coester Sep. 1985 18 p refs Presented at the Workshop on Nuclear Chromodynamics, Santa Barbara, Calif. Submitted for publication
(Contract W-31-109-eng-38)
(DE86-003061; ANL-HEP-CP-85-103; CONF-8508127-9) Avail: NTIS HC A02/MF A01

A detailed derivation is presented of the fact that the deep inelastic structure function of a nucleus may be expressed directly in terms of the empirical structure functions of the constituent nucleons and mesons and the wave function of the nuclear bound state. The assumptions made are specified. The pion exchange model provides a unified quantitative description for all x of nuclear

effects observed in deep inelastic scattering of charged and neutral leptons from nuclei. DOE

N86-26170# Stanford Linear Accelerator Center, Calif.
EMITTANCE GROWTH FROM RADIATION FLUCTUATIONS
M. Sands Dec. 1985 9 p
(Contract DE-AC03-76SF-00515)
(DE86-005085; SLAC-AP-47) Avail: NTIS HC A02/MF A01

As an electron bunch travels through a transport system, fluctuations in the energy loss of individual electrons cause the size of the bunch to grow. A calculation is given of the quantum-induced growth of the emittance of a beam in one transverse coordinate, making the following approximations: (1) that the transport system is linear; (2) that there is no coupling between the two transverse motions; and (3) that the radiation effects can be described by their values on the central design trajectory. This last assumption means that systems are considered in which the quantum effects from bending magnets are much larger than from the focusing lenses. DOE

N86-26171# Florida Univ., Gainesville. Dept. of Chemistry.
INFRARED MULTIPHOTON AND COLLISION INDUCED DISSOCIATION STUDIES OF SOME GASEOUS ALKYLAMINE IONS Technical Report, 1 Apr. - 15 Jul. 1985
C. H. Watson, G. Baykut, M. A. Battiste, and J. R. Eyler 1 Jan. 1986 28 p refs
(Contract N00014-82-K-0509)
(AD-A163504; TR-4) Avail: NTIS HC A03/MF A01 CSCL 07/5

Collision induced dissociation and infrared multiphoton dissociation of ions formed in di- and triethylamine, di- and tri-n-propylamine, and diisopropylamine were investigated by Fourier transform ion cyclotron resonance mass spectrometry. Molecular ions of all amines except di-n-propylamine produced similar fragment ions when subjected to either dissociation technique. The initial fragmentation involved C(alpha)-C(beta) bond cleavage, loss of an alkyl radical, and formation of an immonium ion. Subsequent fragmentations of the immonium ions produced by both dissociation mechanisms involved McLafferty type rearrangements and loss of alkenes. The molecular ion of di-n-propylamine fragmented by a different mechanism when subjected to infrared irradiation. Protonated molecules of di- and tri-n-propylamine yielded C3H6 and an ammonium ion upon infrared multiphoton dissociation, while protonated molecules of the other amines did not dissociate using this technique. Collision induced dissociation, on the other hand, produced fragmentation for all protonated molecules. Explanation of the different fragmentations observed for the two dissociation techniques is given in terms of a mechanism involving a tight transition state for protonated di- and tri-n-propylamine dissociation. GRA

N86-26172# University of Southern California, Los Angeles. Dept. of Chemistry.
THE BIMOLECULAR REACTIONS OF OXIDIZING AGENTS WITH FREE RADICALS OF THE FORM PX: THE ROLE OF COMPLEX NUCLEAR MOTION Final Report, 1 May 1982 - 30 Apr. 1985
Jim-Son Chou, David Sumida, and Curt Wittig 20 Nov. 1985 43 p refs
(Contract DAAG29-82-K-0118)
(AD-A163754; ARO-19095.3-CH) Avail: NTIS HC A03/MF A01 CSCL 07/5

Experimental results are presented wherein nascent PO(X2pi) is detected following the collision-free infrared multiple photon excitation and dissociation of several volatile organosphosphorus molecules which lead to PO via a sequence of bond fission reactions. GRA

N86-26173# California Univ., Berkeley. Dept. of Chemistry.
THE DYNAMICS OF VIBRATIONALLY EXCITED MOLECULES Final Report, 25 May 1981 - 31 Dec. 1984
C. B. Moore 25 Nov. 1985 7 p refs
(Contract DAAG29-81-K-0079)
(AD-A163764; ARO-18039.18-CH) Avail: NTIS HC A02/MF A01 CSCL 07/5

This work studies the transfer of vibrational energy among molecular degrees of freedom and the chemical reactions of vibrationally excited molecules. By resolving the dependence of energy transfer and reaction processes on quantum numbers the mechanism of and forces involved in these processes are identified. GRA

N86-26174# California Univ., Santa Barbara. Dept. of Physics.
DENSITY FUNCTIONAL THEORY FOR EXCITED STATES IN A QUASI LOCAL DENSITY APPROXIMATION Technical Report, Jun. - Dec. 1985
Walter Kohn 10 Feb. 1986 22 p refs
(Contract N00014-84-K-0548; Grant NSF DMR-83-10117)
(AD-A164369; TR-8) Avail: NTIS HC A02/MF A01 CSCL 07/4

Density functional theory has been an important method for studying the ground states for systems involving interacting electrons such as atoms, molecules, and solids. This paper helps to extend this theory to excited states. The starting point of this paper is a recent extension of the Hohenberg Kohn Sham (HKS) density functional theory to ensembles of systems consisting of the M lowest eigenstates, equally weighted. As in E(M/xc)(n(r)), and potential, v(M/xc)(r;(n(r'))). The present paper provides expressions for these quantities, valid for systems of slowly varying density. Even for such systems, however, there are essential non-local effects. Nevertheless both E(M/xc) and v(M/xc) can be calculated in terms of quantities characteristic of appropriate uniform thermal ensembles. This theory is the analog of the ground state local density approximation and allows calculation of excited state energies and densities. GRA

N86-26175# Naval Postgraduate School, Monterey, Calif.
STUDY OF OFF-AXIS RADIATION EXPOSURE FROM RELATIVISTIC ELECTRONS TRAVERSING THROUGH MATTER M.S. Thesis
Richard D. Fitzpatrick Dec. 1985 144 p refs
(AD-A164523) Avail: NTIS HC A07/MF A01 CSCL 20/8

Results are presented from the study of the off-axis radiation field caused by a relativistic, mono-directional electron beam passing through water. Using the Naval Postgraduate School 100 MeV linear accelerator, off-axis radiation dose was measured with calcium fluoride thermoluminescent dosimeters placed at various path lengths out to two radiation lengths. The off-axis dose was calculated using the electron transport code CYLTRAN of the integrated TIGER series of coupled electron/photon Monte Carlo transport codes. Calculations were performed at Los Alamos National Laboratory. Comparison with the results is made and CYLTRAN is found to be in agreement with experimentally measured values. The extension of results from one medium (water) to another (air) appears to be valid. GRA

N86-26176# State Univ. of New York, Buffalo. Dept. of Chemistry.
ANALYSIS OF EXPERIMENTAL DATA FOR NEUTRALIZATION OF LOW-ENERGY IONS AT A SURFACE Interim Technical Report
Hai-Woong Lee and Thomas F. George Jan. 1986 48 p Sponsored by State Univ. of New York, Buffalo. Prepared in cooperation with Oakland Univ., Rochester, Mich.
(Contract N00014-86-K-0043)
(AD-A163205; TR-3) Avail: NTIS HC A03/MF A01 CSCL 07/4

When low energy ions are incident on a solid surface, a large fraction is neutralized via an Auger or resonance process. Some useful information on details of the neutralization process can be obtained by studying the ion fraction of backscattered particles. An accurate evaluation of the characteristic velocity is expected to be particularly useful. In this paper we give a theoretical analysis of experimental ion yield data that exist in the literature. It is shown that a successful interpretation of the ion yield data can be made by taking into account the variation of the characteristic velocity with respect to the incident ion energy. GRA

N86-26177# Los Alamos National Lab., N. Mex.
SINGLE PARTICLE FEL EQUATIONS WITH OVERTONES

C. J. Elliott and M. J. Schmitt 1985 13 p Presented at the 7th International Free-Electron Laser Conference, Tahoe City, Calif., 8 Sep. 1985
(Contract W-7405-eng-36)
(DE86-002423; LA-UR-85-3862; CONF-850956-16) Avail: NTIS HC A02/MF A01

A generalization of the usual single-particle equations for a linear polarized wiggler is discussed. Particle simulations show the presence of harmonics under conditions of low (GAMMA) and high magnetic fields. These harmonics are introduced into the single particle equations by separate field components for each harmonic. The overtones are fed by the same phase space and all their effects on the particle motion are treated simultaneously. The coupling of the magnetic field differs from the usual bessel functions form because of the low electron energy and the high magnetic field. Longitudinal space charge fields are also discussed. The reduced equation results with a full 1D particle simulation are compared. Finding good agreement, the researchers conclude that harmonic generation has a significant impact on the waveform under these conditions. DOE

N86-26178# Sandia National Labs., Albuquerque, N. Mex.
MULTI-PHOTON EXCITATION AND IONIZATION CROSS SECTIONS IN ATOMIC OXYGEN
E. J. MCGuire 1985 12 p refs Presented at the Antigone and Delphi Workshop, Livermore, Calif., 23 Oct. 1985
(Contract DE-AC04-76DP-00789)
(DE86-002912; SAND-85-2339C; CONF-8510191-1) Avail: NTIS HC A02/MF A01

Calculations are presented on a variety of multiphoton excitation and ionization cross sections in oxygen. The regimes of cross sections discussed are: 2-photon excitation to the bound (2p) (3) (4)S (nl) levels; 2-photon excitation to the autoionizing (2p) (3) (2)D (3p) and (2p) (3) (2)P (3p) levels; excitation of the (2p) (4) (1)D and (1)S levels by both 1-photon excitation on forbidden transitions and 2-photon excitations; 1-photon photoionization of the (2p) (3) (4)S (3s) (3)S and (2p) (3) (4)S (3p) (3)P levels; and 3-photon nonresonant ionization with the (2p) (3) (4)S (3p) (3)P level as intermediate resonance. DOE

N86-26179# National Bureau of Standards, Gaithersburg, Md. Center for Radiation Research.
ANGULAR DISTRIBUTION OF HIGH ENERGY ELECTRONS FOLLOWING RADIATION
L. C. Maximon and A. Lepretre Oct. 1985 53 p Prepared in cooperation with Commissariat a l'Energie Atomique, Gif-sur-Yvette, France
(PB86-141934; NBSIR-84-2854) Avail: NTIS HC A04/MF A01 CSCL 20H

An expression was derived for the angular distribution of high energy electrons which have undergone scattering and radiated a photon, integrated over the directions of the emitted photon, in the region of small scattering angles, for which the atomic form factor must be taken into account but the nuclear structure may be neglected. This distribution is analogous to Schiff's high energy small-angle distribution for photons, integrated over the final electron angles. It is shown that the correction to the energy-angle distribution of electrons due to atomic screening is identical in form to the correction to the energy-angle distribution of photons. The correction involves an integral over the atomic form factor, and is evaluated in closed form for the Thomas-Fermi-Moliere model. A very simple expression is obtained for the case of complete screening. GRA

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N86-26180# Fermi National Accelerator Lab., Batavia, Ill.
FUTURE DETECTOR NEEDS FOR HIGH ENERGY PHYSICS
D. Green Oct. 1985 7 p refs Presented at the IEEE Nuclear Science Symposium, San Francisco, Calif., 23-25 Oct., 1985
(Contract DE-AC02-76CH-03000)
(DE86-003032; FNAL/C-85/151; CONF-851009-22) Avail: NTIS HC A02/MF A01

High energy physics, as exemplified by the SSC, requires the analysis of increasingly complex events which occur at ever higher event rates. The SSC detectors embody an order of magnitude increase in cost and complexity. Research and development for a 500 M$ detector with 500K data channels must proceed in step with accelerator design. Up to a decade of R and D at 1% per year (5M$) invested should be expected. This implies the close involvement of industry. DOE

N86-26181# Los Alamos National Lab., N. Mex.
PREDICTING NITRIDE FUEL PERFORMANCE FOR SP-100 CONDITIONS
R. E. Baars 1986 4 p Presented at the 3rd Symposium on Space Nuclear Power Systems, Albuquerque, N. Mex., 13-16 Jan. 1986
(Contract W-7405-eng-36)
(DE86-000796; LA-UR-85-3479; CONF-860102-1) Avail: NTIS HC A02/MF A01

This paper reports on the methods used to evaluate the performance of the nitride fuel design proposed for the SP-100 thermoelectric concept. DOE

N86-26182# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
PARTICLE BEAM TRACKER FOR AN ACCELERATING TARGET M.S. Thesis
Lawrence C. Jamerson Dec. 1985 110 p refs
(AD-A163945; AFIT/GE/ENG/85D-22) Avail: NTIS HC A06/MF A01 CSCL 20/7

The purpose is to use a PI(Proportional plus INTEGRAL) controller to point the centroid of a particle beam at an intended target. Multiple Model Adaptive Estimator is used to estimate the centroid of a one-dimensional Gaussian shaped source of photo-electron events. Merge Method of filter pruning is used to limit the size of this filter. A standard Kalman filter is used to estimate the position of the target where the target is initially modelled as a first-order Gauss Markov position process and later as a first-order Gauss Markov acceleration process. A PI controller is designed using LQG methods, and true states are replaced by their best estimates by invoking the principle of assumed certainty equivalence. With a target position model within the software, a parameter sensitivity analysis is performed as well as a robustness study where unmodelled constant and sinusoidal disturbances are added to the system. With a target acceleration model within the software, a robustness study is carried out where target parameters are varied within the truth model without telling the filter. In an attempt to recover full state feedback robustness qualities, Loop Transmission Recovery tuning is attempted. GRA

N86-26183# Naval Postgraduate School, Monterey, Calif.
EFFECTS OF VARIATION OF INDEX OF REFRACTION OF ATMOSPHERE ON CERENKOV RADIATION M.S. Thesis
Kyung Ro Joo Dec. 1985 48 p refs
(AD-A164358) Avail: NTIS HC A03/MF A01 CSCL 20/8

Cerenkov radiation is calculated for electron beams which exceed the velocity of light in a nondispersive dielectric medium. The electron beam is assumed to be bunched as emitted from a traveling wave accelerator and the emission region is assumed to be finite. The direction of emission of the Cerenkov radiation is related to the index of refraction which in turn is related to atmospheric index of refraction. The calculated index of refraction in the atmosphere predicts changes to the Cerenkov radiation pattern and the emission threshold condition. GRA

N86-26184# Mission Research Corp., Albuquerque, N. Mex.
ELECTROMAGNETIC INSTABILITY IN A QUADRUPOLE-FOCUS ACCELERATOR
Thomas P. Hughes and Brendan B. Godfrey Oct. 1985 27 p
(Contract N00014-84-C-0078)
(AD-A163206; AMRC-R-323) Avail: NTIS HC A03/MF A01 CSCL 20/7

The addition of helical focusing to a modified betatron configuration is shown to give rise to an electromagnetic instability under certain conditions. The instability arises from a three wave coupling between the helical field, a transverse mode on the beam, and a transverse-electric waveguide mode. An analytic dispersion relation is derived. Several features of the instability are confirmed using three dimensional computer simulations. GRA

N86-26185# Mission Research Corp., Albuquerque, N. Mex.
ESTIMATES OF NEGATIVE-MASS INSTABILITY GROWTH FOR THE NRL BETATRON
Thomas P. Hughes Dec. 1985 19 p
(Contract N00014-84-C-0078)
(AD-A163207; AMRC-R-327) Avail: NTIS HC A02/MF A01 CSCL 20/7

Growth rates of the negative-mass instability are calculated for parameters close to those of the NRL betatron. The results indicate that the negative-mass transition energy is at, or close to, the injection energy. In the absence of a spread in particle circulation frequencies, strong negative-mass growth is predicted to set in as the beam is accelerated. To avoid this, it may be necessary to significantly increase the beam minor radius. A stability criterion in terms of the minor radius is given. GRA

N86-26186# Los Alamos National Lab., N. Mex.
SPACE NUCLEAR SAFETY PROGRAM Progress Report, Apr. 1984
T. G. George, comp. Oct. 1985 25 p
(Contract W-7405-eng-36)
(DE86-00437; LA-10526-PR) Avail: NTIS HC A02/MF A01

This technical monthly report covers studies related to the use of (238) PuO2 in radioisotope power systems carried out for the Office of Special Nuclear Projects of the US Department of Energy by Los Alamos National Laboratory. Covered are: general-purpose heat source testing and recovery, and safety technology program (biaxial testing, iridium chemistry). DOE

N86-26187# Los Alamos National Lab., N. Mex.
SPACE NUCLEAR SAFETY PROGRAM Progress Report, May 1984
T. G. George, comp. Sep. 1985 30 p
(Contract W-7405-eng-36)
(DE86-004375; LA-10536-PR) Avail: NTIS HC A03/MF A01

This technical monthly report covers studies related to the use of (238) PuO2 in radioisotope power systems carried out for the Office of Special Nuclear Projects of the US Department of Energy by Los Alamos National Laboratory. Covered are: general-purpose heat source testing, light-weight radioisotope heater unit, and iridium biaxial testing. DOE

N86-26188# Argonne National Lab., Ill.
TORSION AND GEOMETROSTASIS IN COVARIANT SUPER-STRINGS
C. Zachos 1985 4 p refs Presented at the Meeting of the Particles and Fields Div. of the American Physical Society, Eugene, Oreg., 12 Aug. 1985
(Contract W-31-109-eng-38)
(DE86-001793; CONF-850869-3) Avail: NTIS HC A02/MF A01

The covariant action for freely propagating heterotic super-strings consists of a metric and a torsion term with a special relative strength. It is shown that the strength for which torsion flattens the underlying 10-dimensional superspace geometry is precisely that which yields free oscillators on the light cone. This is in complete analogy with the geometrostasis of two dimensional sigma models with wess-zumino interactions. DOE

N86-26189# Department of Energy, Washington, D. C. High Energy Physics Div.
REPORT OF THE 1985 HIGH ENERGY PHYSICS ADVISORY PANEL STUDY OF THE US HIGH ENERGY PHYSICS PROGRAM, 1985 - 1995
Sep. 1985 88 p
(DE86-002484; DOE/ER-0233) Avail: NTIS HC A05/MF A01

The present study was motivated by the desire to examine the US High Energy Physics Program in depth, to reassess the Superconducting Super Collider (SSC) goal in light of recent scientific and technical developments, and to understand how this project would affect and interact with the US High Energy Program in the period before it becomes operational. It is recommended that the SSC research and development be given the highest priority in the US High Energy Physics Program so that the project can proceed to an early construction start and rapid completion. A limited number of programs are identified as forefront programs - those which enter an experimental regime in such a way as to have clear promise for fundamental discoveries and it is recommended that these proceed with priority. Research opportunities available during the next ten years are explored, including proton-antiproton colliders, electron-proton colliders, electron-positron colliders, fixed target experiments, and nonaccelerator experiments. DOE

N86-26131# Joint Publications Research Service, Arlington, Va.
SEPARATION OF U-238 AND Np-237 NUCLEI BY GAMMA-QUANTA INTERMEDIATE ENERGIES Abstract Only
A. A. Kazakov, G. Ya. Kezerashvili, T. Ye. Lazareva, V. G. Nedorezov, A. N. Skrinskiy, A. S. Sudov, G. M. Tumaykin, and Yu. M. Shatunov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 24 Transl. into ENGLISH from Pisma V Zhurnal Eksperimentalnoy I Teoreticheskoy Fiziki (Moscow, USSR), v. 40, no. 10, 25 Nov. 1984 p 445-447 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

74 OPTICS

Includes light phenomena.

N86-26190* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OPTICAL MULTIPLE SAMPLE VACUUM INTEGRATING SPHERE Patent
Cyrus L. Butner, inventor (to NASA) Issued 22 Apr. 1986 6 p Filed 30 Nov. 1983 Sponsored by NASA
(NASA-CASE-GSC-12849-1; US-Patent-4,583,860; US-Patent-Appl-SN-556481; US-Patent-Class-356-446; US-Patent-Class-250-228; US-Patent-Class-56-73; US-Patent-Class-356-236; US-Patent-Class-356-244) Avail: US Patent and Trademark Office CSCL 20F

An integrating sphere comprised of a uniform difusely reflecting spherical cavity, having mutually transverse input and output ports, and a linear sample transport mechanism is described. The sample transport mechanism is secured so that the multiple samples can be brought into registration with the input port, one at a time, without having to open or disassemble the apparatus when a change of sample is desired. A vacuum tight seal is provided between the cavity and the transport mechanism. This maintains the integrity of a vacuum generated with the sphere when attached to the source of optical energy. The device is utilized to test emissive characteristics such as the relative fluorescence quantum efficiency of a dye sample placed in the path of a monochromatic optical energy source coupled to the input port while having a light detector coupled to the output port. B.G.

N86-26191# Lawrence Livermore National Lab., Calif.
SCATTERING OF LIGHT BY NONSPHERICAL PARTICLES
K. L. Coulson Dec. 1985 25 p
(Contract W-7405-eng-48)

(DE86-004666; UCID-20609) Avail: NTIS HC A02/MF A01

Methods of computing scattering by non-spherical particles are reviewed for the Mie theory, the Rayleigh-Gans approximation, the geometric optics method, the extended boundary condition method, the anomalous diffraction, the suppression of resonances, the statistical approach, the expansion of vector wave equations in spheroidal coordinates, and the semi-empirical theory of Pollack and Cuzzi. The results of computations for nonspherical particles are compared for prolate and oblate spheroids, homogeneous sphere with holes, rough particles made of stacked cylinders, irregular particles of various shapes, and particles of carbonaceous smokes. Conclusions are presented in the context of nuclear winter. DOE

N86-26192# Sandia National Labs., Albuquerque, N. Mex.
DESIGN OF A LOW-NOISE FIBER-OPTIC TRANSMITTER MODULE
R. R. LeGalley Dec. 1985 15 p
(Contract DE-AC04-76DP-00789)
(DE86-004976; SAND-85-1199) Avail: NTIS HC A02/MF A01

The design of a fiber-optic transmitter module is described. This design increases the signal-to-noise margin by reducing crosstalk between adjacent transmitters. Further improvement was obtained by reducing electromagnetic interference through the use of shielding. DOE

N86-26193# California Univ., Berkeley. Lawrence Berkeley Lab.
X-RAY DATA BOOKLET. CENTER FOR X-RAY OPTICS
D. Vaughan, ed. Oct. 1985 155 p
(Contract DE-AC03-76SF-00098)
(DE86-005122; LBL-PUB-490) Avail: NTIS HC A08/MF A01

The Center for X-Ray Optics of the Lawrence Berkeley Laboratory (CA) has published an X-Ray Data Handbook. DOE

N86-26194# Columbia Univ., New York. Radiation Lab.
RESEARCH INVESTIGATION DIRECTED TOWARD EXTENDING THE USEFUL RANGE OF THE ELECTROMAGNETIC SPECTRUM Progress Report, 1 Apr. 1984 - 30 Sep. 1985
George W. Flynn and Richard M. Osgood, Jr. 31 Dec. 1985 310 p refs
(Contracts DAAG29-85-K-0049; F49620-84-K-0022; N00014-78-C-0517; DAAG29-85 K-0210; Grants AF-AFOSR-0013-84; NSF DMR-80-06966)
(AD-A163482; PR-35) Avail: NTIS HC A14/MF A01 CSCL 20/6

The characteristics of light generated by distinctly non-Poisson processes have been studied with particular interest in sub-Poisson light (light whose photon-number fluctuations are lower than those of lasers). The use of such quiet light can be beneficial, e.g., it could possibly increase the distance between repeaters in a fiber-optic communications system. As an example of a mechanism for producing such light, a Franck-Hertz apparatus excited by a space-charge-limited electron beam has been studied. Extensive theoretical calculations of the properties of such a source of light have been carried out. Under suitable conditions this device can produce antibunced and sub-Poisson photon emissions. Initial experiments were carried out which produced a photon-counting distribution that was indeed sub-Poisson, thereby providing the first cw source of nonclassical quiet light. A quantum analog of the Burgess variance theorem has also been proven. This confirmed that the sub-Poisson nature of a light beam is conserved in the presence of absorptive media and additive (Poisson) background light. Thus the light can be used once it is generated. Two other ways of producing nonclassical light have been investigated: (1) the generation of sub-Poisson light by selective deletion from cascaded atomic emissions and (2) the generation of binomial states of the quantized radiation field and an exploration of their properties. GRA

N86-26195# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
SUPERRESOLUTION USING INCOHERENT LIGHT AND THE LEAST SQUARES METHOD M.S. Thesis
Robert F. Stierwalt Dec. 1985 69 p refs
(AD-A163964; AFIT/GEO/ENP/85D-5) Avail: NTIS HC A04/MF A01 CSCL 14/5

This thesis discusses the problem of incoherent imaging in a diffraction-limited optical system. Its purpose was to prove that resolving two incoherent point sources of light is possible and achievable under certain circumstances. The effects of noise are considered when trying to super-resolve the two incoherent objects. The analysis assumes a finite object of known maximum extent with an estimation of the noise in the system. The noise is assumed to be Gaussian, white, and additive for all spatial frequencies. The superresolution process uses the standard least squares process to achieve minimum error with a smoothing or regularization procedure. The singular values of the transfer matrix are modified to attenuate the very small singular values to avoid noise amplification in the high order terms. The effect of the noise is overcome by the use of a smoothing parameter. The superresolution process works extremely well when the extent of the object is known a priori to have a certain bound or maximum. Components of the restored or processed object outside the known bounds are attenuated. Results indicate that band-pass pupils can super resolve with only limited knowledge of the object when the smoothing parameter is used. GRA

N86-26196# Hughes Research Labs., Malibu, Calif.
INVESTIGATION OF OPTICAL FIBERS FOR NONLINEAR OPTICS Annual Report, 1 Apr. 1984 - 31 Mar. 1985
Larry DeShazer, Antonio Pastor, and Stephen Rand Nov. 1985 68 p refs
(Contract F49620-84-C-0043)
(AD-A164075; AFOSR-86-0009TR) Avail: NTIS HC A04/MF A01 CSCL 20/6

The principal objective of this research program is to develop single-crystal (SC) fibers for use in nonliner optical devices. This encompasses measurement of physical and chemical properties of several candidate materials, fabrication of SC fibers, and investigation of nonlinear optical applications. This report describes the successful fabrication of several SC fibers using new growth techniques and progress with hybrid fibers which show great promise for nonlinear optical applications. GRA

N86-26197# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE APODISATION OF ABERRATED COHERENT MULTIAPERTURE OPTICAL IMAGING SYSTEMS A01 M.S. Thesis
Arley J. Hugghins Dec. 1985 125 p refs
(AD-A164123; AFIT/GEP/ENP/85D-6) Avail: NTIS HC A06/MF A01 CSCL 20/6

This investigation determined that the application of a Gaussian apodiser did not improve the imaging performance through a coherent multiaperture optical imaging system. This was the case whether the object was a point source or an edge, whether the dilution was increased or held constant, or whether aberrations were present or not present. Further, the investigation determined that the amount of spacing between the subaperture which either an aberrated or unaberrated optical system could tolerate and still obtain acceptable imaging fell dramatically. The analysis was accomplished with computer codes which made use of Fourier transform techniques to perform the imaging. The edge imaging results of this study can be applied without loss of generality to that of an imaging system with an annular exit pupil. GRA

N86-26198# Naval Postgraduate School, Monterey, Calif.
COMPUTER MODELING OF IR ENCOUNTERS AND COUNTERMEASURE EFFECTIVENESS M.S. Thesis
Jeffery W. Wilson Dec. 1985 102 p refs
(AD-A164359) Avail: NTIS HC A06/MF A01 CSCL 17/4

Two computer modeling programs, LOWTRAN6 and DMAD have been converted for use at the Naval Postgraduate School. LOWTRAN6, used to model the propagation of optical radiation through the atmosphere at low resolution, has been modified to permit interactive use on the school's IBM 3033AP computer; two additional programs have been developed to provide interactive

data acquisition and plotting. DMAD has been implemented on a VAX-11/780 computer; it is used to model the effectiveness of infrared countermeasure decoys against infrared-seeking anti-ship missiles. Work has also been conducted toward the conversion of FASCODE, an infinite resolution line-by-line transmittance/radiance code. The AFGL MAIN line parameters tape has been implemented on the IBM 3033AP. Many computer programs presently used in the mathematical modeling of weapons and combat systems ignore some critical physical parameters. Using LOWTRAN6 data, the importance of including atmospheric parameters such as transmittance in a model such as DMAD has been demonstrated. GRA

N86-26199# Purdue Univ., West Lafayette, Ind. School of Electrical Engineering.
NONLINEAR NONRECIPROCITY. THEORY AND APPLICATIONS TO THE ENHANCEMENT OF THE SAGNAC EFFECT, OPTICAL BISTABILITY Final Report, 1 Sep. - 31 Oct. 1984
A. E. Kaplan 26 Nov. 1985 84 p refs
(Grant AF-AFOSR-0343-83)
(AD-A164374; AFOSR-85-1205TR) Avail: NTIS HC A05/MF A01 CSCL 20/6

Several novel implementations of optical bistability have been proposed and analyzed. Novel applications of optical nonlinearities in a ring have been proposed; particularly interesting is the use of nonlinear nonreciprocity of counterpropagating waves in a ring to enahnce the Sagnac Effect, and, thereby, increase the sensitivity of a passive ring optical gyro. The use of moderate energy electron beams traversing superlattices to generate coherent X-rays by the coherent addition of transition radiation has also been proposed and analyzed. This document is a collection of articles pertaining to such fields as: solitons; cyclotron resonance of free electrons; high energy electron beams. Author (GRA)

N86-26200# Army Communications-Electronics Command, Fort Monmouth, N.J.
PROCEEDINGS OF THE 34TH WIRE AND CABLE SYMPOSIUM HELD AT CHERRY HILL, NEW JERSEY ON 19-21 NOVEMBER 1985
21 Nov. 1985 448 p refs Symposium held in Cherry Hill, N.J., 19-21 Nov. 1985
(AD-A164384) Avail: NTIS HC A19/MF A01 CSCL 17/2

Contents: The Teleco Explosion: How Far and How Fast; Fiber Optic Cable Design I; Materials; Fiber Optic Cable Design II; Design/Testing I; Design/Testing II: Fire, Smoke, and Toxicity Technology; Splicing/Enclosures/Connectors I; Fiber Optic Application/Installation; Fiber Optic Systems/Networks; Splicing/Enclosures/Connectors II. GRA

N86-26201# San Diego State Univ., Calif. Dept. of Physics.
PHOTOCHROMIC MATERIALS STUDY Final Technical Report, Jun. 1984 - Jun. 1985
Jeffrey A. Davis and Mary Thomas Sep. 1985 41 p
(Contract F30602-84-K-0110)
(AD-A163140; RADC-TR-85-177) Avail: NTIS HC A03/MF A01 CSCL 20/6

This report describes a study conducted to determine the feasibility of using the photochromic material mercury dithizonate as a programmable spatial filter for optical processing. This material has exhibited faster sriting speed and finer resolution than conventional spatial filtering techniques. Photochromics are erasable and therefore reusable. Variations in material performance were discovered and are attributed to the presence of two photochromic species in the material. A follow-up effort will investigate the effects of varying the composition of the photochromic material upon its optical properties. GRA

N86-26202# Air Force Geophysics Lab., Hanscom AFB, Mass.
OPTICAL AND RADIATIVE PROPERTIES OF A DESERT AEROSOL MODEL Interim Report
Eric P. Shettle 3 Jan. 1986 5 p Presented at the International Radiation Symposium on Current Problems in Atmospheric Radiation, Perugia, Italy, 21-28 Aug. 1984
(AD-A163181; AFGL-TR-86-0003) Avail: NTIS HC A02/MF A01 CSCL 20/6

One of the major sources of the natural atmospheric aerosols is wind-blown dust and sand. These predominantly originate from the arid and semi-arid regions which make up one-third of the earth's land area. The aerosol models in the Standard Radiation Atmospheres (SRA) of the IAMAP Radiation Commission, do not include a model specifically representative of these regions. Several recommendations were made for developing such a separate desert aerosol model. This paper presents the optical and radiative properties of a desert aerosol model based on those recommendations. Two models are discussed representing the extremes of background conditions and a severe dust storm. GRA

N86-26203# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A MIRROR MAGNIFIER
M. N. Sokolskiy 13 Dec. 1985 7 p Transl. into ENGLISH of Russian Patent No. 312 166 (19 Aug. 1971) p 1-2
(AD-A163204; FTD-ID(RS)T-0887-85) Avail: NTIS HC A02/MF A01 CSCL 20/6

Mirror magnifiers are known that contain a light with collimator, a system of mirrors and an output registration system. The described device differs from the known types by the fact that, behind the collimator, there is a diaphragm with two openings, the orthogonal projection of the one which, onto the plane perpendicular to the principal cross section of the object, is covered by the trace of the object on this plane, while the projection of other opening lies outside this trace. GRA

N86-26204# Department of the Air Force, Washington, D.C.
HYBRID SINGLE CRYSTAL OPTIC FIBERS Patent Application
Stephen C. Rand, inventor (to Air Force) Filed 6 Nov. 1985 10 p
(AD-D012089; US-Patent-Appl-SN-795572) Avail: NTIS HC A02/MF A01 CSCL 20/6

This patent application discloses a process of fabricating a hybrid single crystal fiber having nonlinear optical properties such as frequency doubling. This process includes applying a force to a fiber core resting upon a bulk nonlinear crystal such as LiIO3 in a saturated solution of LiIO3 in water. After the core is embedded a sufficient distance into the crystal, the force is removed. GRA

N86-26205# Department of the Air Force, Washington, D.C.
SINUSOIDAL DETERMINATION OF LIMITING OPTICAL RESOLUTION Patent Application
Gilbert G. Kuperman, inventor (to Air Force) Filed 1 Nov. 1985 38 p
(AD-D012099; US-Patent-Appl-SN-793812) Avail: NTIS HC A03/MF A01 CSCL 14/5

The patent application discloses an optical system limiting resolution determination arrangement employng sinusoidal intensity modulated bar pattern input stimuli including two sequences for determining the modulation transfer function (MTF) component of limiting resolution; one of these and the disclosed aerial image modulation (AIM) curve determination are based on sinusoidal intensity modulated bar patterns, while the other MTF determination uses a Heaviside edge function stimulus and a sinusoidally determined AIM curve. The disclosed limiting resolution is especially useful in the consideration of aerial image devices such as cameras. GRA

N86-26206# Department of the Air Force, Washington, D.C.
FIBER OPTIC PYROMETRY WITH LARGE DYNAMIC RANGE Patent Application
Biswa Ganguly, inventor (to Air Force) Filed 8 Aug. 1985 37 p
(AD-D012100; US-Patent-Appl-SN-763575) Avail: NTIS HC A03/MF A01 CSCL 17/8

This patent application discloses a fiber optic probe apparatus usable for measuring temperatures with increased dynamic range and frequency domain response and desirable measurement accuracy. A black body signal source, fiber optic signal coupling, and extension of the transducer dynamic range with optical multiplexing are employed; the instrument operates in the range

of 1.6 micrometers of optical energy wavelength and preferably employs recently improved indium gallium arsenide photodiode transducer devices and transducer frequency domain compensation. Use of the instrument in measuring combustion flame transient temperatures is disclosed. GRA

N86-26207# Department of the Air Force, Washington, D.C.
ANAGLYPHIC STEREOSCOPIC IMAGE APPARATUS AND METHOD Patent
Gilbert G. Kuperman and Donald L. Wallquist, inventors (to Air Force) Issued 10 Dec. 1985 19 p refs
(AD-D012109; US-Patent-4,558,359; US-Patent-Appl-SN-547610; US-Patent Class-358-89) Avail: US Patent and Trademark Office CSCL 17/8

An image processing apparatus of aids in the analysis of images through the introduction of additional physically displaced image elements in complementary color which are generated by digital processing of original image elements. The added elements and original image are viewed stereoscopically on an electronic reconstructed image display. Author (GRA)

N86-26208# Department of the Navy, Washington, D. C.
FIBER OPTIC INTERFEROMETER USING TWO WAVELENGTHS OR VARIABLE WAVELENGTH Patent
Thomas G. Giallorenzi, Sang K. Sheem, and Henry F. Taylor, inventors (to Navy) Issued 12 Nov. 1985 12 p
(AD-D012121; US-Patent-4,552,457; US-Patent-Appl-SN-462860; US-Patent-Class-356-345) Avail: US Patent and Trademark Office CSCL 20/6

This patent discloses a fiber optic interferometric physical sensor. A fiber optical Mach-Zehnder interferometer includes a sensor arm and a reference arm having different optical path lengths. A transducer coupled to the sensor arm modulates the phase of light signals passing through in response to a physical quantity. The interferometer is supplied with an input optical signal which includes light components at two different wavelengths. The detected intensity of the output of the interferometer includes two components, each of which vary in relation to the physical quantity. Each output component is related to one of the two optical input wavelengths. The two output components differ in phase by an amount proportional to the path length difference between the sensor and reference arms and proportional to the wavelength difference between the sensor and reference arms and proportional to the wavelength difference between the light components of the input optical signal. The phase difference is adjusted such that the sensitivities of the two output components to the physical quantity are never simultaneously at a minimum. GRA

N86-26209# Department of the Air Force, Washington, D.C.
MICROMIRROR SPATIAL LIGHT MODULATOR Patent Application
David Armitage, inventor (to Air Force) Filed 9 Oct. 1985 18 p
(AD-D012135; US-Patent-Appl-SN-785691) Avail: NTIS HC A02/MF A01 CSCL 09/3

This patent application discloses a micromirror spatial light modulator having an associated silicon photodiode for photoaddressing a micromirror array, and a readout system for providing intensity-to-positon encoding and for providing a color image from coded monochromatic input light. GRA

N86-26210# Los Alamos National Lab., N. Mex.
DAMAGE RESISTANCE OF COATED OPTICS
W. R. Wadt 1985 21 p Presented at the Symposium on Lasers and Particle Beams for Fusion and Strategic Defense, Rochester, N.Y., 18 Apr. 1985
(Contract W-7405-eng-36)
(DE86-002391; LA-UR-85-3471; CONF—850476-3) Avail: NTIS HC A02/MF A01

Successful application of high energy lasers to national needs in strategic defense, inertial confinement fusion and isotope separation is contingent on the development of optical coatings that can withstand very intense radiation. Significant progress has been made in the development of damage resistant coatings over the past 15 years to support the needs of the inertial confinement fusion and isotope separation programs. However, the requirements evolving from the Strategic Defense Initiative (SDI) are much more severe and demand dramatic improvements in the performance of optical coatings beyond the current state of the art. The approach taken at Los Alamos towards solving the problems of optical coatings for SDI is presented. DOE

N86-25529# Joint Publications Research Service, Arlington, Va.
ELASTOHYDRODYNAMIC PROBLEM FLUID FLOWING TOWARD CRACK IN POROUS MEDIUM Abstract Only
A. V. Baluyeva and A. F. Zazovskiy *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-006) 14 Mar. 1986 p 74 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhanika Tverdogo Tela (USSR), no. 5, Sep.-Oct. 1985 p 157-166 (For primary document see N86-25525 16-31)
Avail: NTIS HC A06/MF A01

N86-26132# Joint Publications Research Service, Arlington, Va.
METEOROLOGICAL CORRECTION TO REFRACTION OF OPTICAL WAVE BEAMS Abstract Only
V. P. Lukin, A. E. Melamud, and V. L. Mironov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 27-28 Transl. into ENGLISH from Izvestiya Vysshikh Uchebnykh Zavedeniy: Fizika (Tomsk, USSR), no. 8, Aug. 1985 p 51-56 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26134# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF PERTURBATIONS OF THE SPECTRA OF POLARITON RAMAN SCATTERING OF LIGHT IN NONLINEAR CRYSTALS Abstract Only
V. S. Gorelik, L. G. Reznik, and V. S. Umarov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 30 Transl. into ENGLISH from Akademiya Nauk SSSR (Moscow, USSR), Preprint no. 6, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26135# Joint Publications Research Service, Arlington, Va.
LASER RADIATION WAVEFRONT REVERSAL WITH INTERMEDIATE FREQUENCY CONVERSION TO ANOTHER BAND Abstract Only
V. I. Bespalov, M. A. Dvoretskiy, A. M. Kiselev, and G. A. Pasmanik *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 31 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2505-2507 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26136# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF LASER RADIATION ON INDUCED ABSORPTION SPECTRA OF PURE QUARTZ GLASS OPTICAL FIBERS Abstract Only
Ye. M. Dianov, V. N. Karpechev, L. S. Korniyenko, A. O. Rybaltovskiy, and P. V.. Chernov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 32 Transl. into ENGLISH from Kvantovaya Elektronika (Moscow, USSR), v. 11, no. 12, Dec. 1984 p 2480-2486 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26137# Joint Publications Research Service, Arlington, Va.
ANALYSIS AND INVESTIGATION OF A COHERENT WAVEFIELD IN THE FOCAL REGION OF RADIAL-SYMMETRIC OPTICAL ELEMENTS Abstract Only
A. G. Vasin, M. A. Golyo, V. A. Danilov, N. L. Kazanskiy, S. V. Karpeyev, I. N. Sisakyan, V. A. Soyfer, and G. V. Uvarov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 34 Transl. into ENGLISH from Preprint no. 304, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, USSR, 1983 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26138# Joint Publications Research Service, Arlington, Va.
CORRELATION PROPERTIES OF OPTICAL FIELDS Abstract Only
V. P. Vykov and G. V. Shepelev *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 35 Transl. into ENGLISH from Preprint no. 149, Institut Obshchey Fiziki, Laboratoriya Volnovykh Yavleniy, Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26155# Joint Publications Research Service, Arlington, Va.
TWO TYPES OF NONLINEAR OPTICAL SUSCEPTIBILITY Abstract Only
An. V. Vinogradov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 60 Transl. into ENGLISH from Preprint no. 42, Lebedev Physcial Inst., Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N86-26211# Nagoya Univ. (Japan). Inst. of Plasma Physics.
TRANSPORT THEORY OF AXISYMMETRIC TOROIDAL PLASMA WITH RF WAVE SOURCE IN THE PFIRSCH-SCHRUETER REGIME
Masayoshi Taguchi (Tokyo Univ. (Japan).) Feb. 1986 27 p refs (IPPJ-765) Avail: NTIS HC A03/MF A01

The neoclassical transport theory of a plasma with the radio frequency wave source is formulated in the Pfirsch-Schrueter regime. The particle and heat fluxes across the magnetic surfaces induced by the radio frequency wave injection are numerically calculated for two ion species plasma. The analytic expressions for these fluxes are also obtained when the parallel phase velocity of the wave is about 2 to 3 times as fast as the ion thermal velocity. Then the parallel phase velocity is slower than the ion thermal velocity, the radio frequency wave source is shown to be approximately considered as the momentum, the energy and the heat flow sources. Author

N86-26212# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
ANALYTIC MOMENT METHOD CALCULATIONS OF THE DRIFT WAVE SPECTRUM
D. R. Thayer and K. Molvig Nov. 1985 82 p
(Contract DE-AC02-78ET-51013)
(DE86-003750; DOE/ET-51013/165; PFC/RR-85-23) Avail: NTIS HC A05/MF A01

A derivation and approximate solution of renormalized mode coupling equations describing the turbulent drift wave spectrum is presented. Arguments are given which indicate that a weak turbulence formulation of the spectrum equations fails for a system with negative dissipation. The inadequacy of the weak turbulence theory is circumvented by utilizing a renormalized formation. An analytic moment method is developed to approximate the solution of the nonlinear spectrum integral equations. The solution method employs trial functions to reduce the integral equations to algebraic equations in basic parameters describing the spectrum. An approximate solution of the spectrum equations is first obtained for a mode dissipation with known solution, and second for an electron dissipation in the NSA. DOE

N86-26213# Oak Ridge National Lab., Tenn.
COMPARATIVE MEASUREMENT OF THE NEUTRAL DENSITY AND PARTICLE CONFINEMENT TIME IN EBT
J. C. Glowienka and R. K. Richards Nov. 1985 21 p refs
(Contract DE-AC05-84OR-21400)
(DE86-004645; ORNL/TM-9704) Avail: NTIS HC A02/MF A01

The neutral density and particle confinement time in the ELMO Bumpy Torus-Scale Experiment (EBT-S) have been determined by two different techniques. These involve a spectroscopic measurement of molecular and atomic hydrogen emissions and a time-decay measurement of a fast-ion population using a diagnostic neutral beam. The results from both diagnostics exhibit identical trends for either estimate, although the absolute values differ by a factor of 2 to 3. The observed variations with fill gas pressure and microwave power from either technique are consistent with measurements of electron density and temperature. The measurement techniques are discussed, and the results are compared in the context of consistency with independently observed plasma behavior. DOE

N86-26214# GA Technologies, Inc., San Diego, Calif.
REVIEW OF ELECTRON CYCLOTRON HEATING EXPERIMENTS IN TOROIDAL DEVICES
R. Prater Nov. 1985 31 p refs Presented at the Course and Workshop on Applications of RF Waves To Tokamak Devices, Varenna, Italy, 5-14 Sep. 1985 Submitted for publication
(Contract DE-AC03-84ER-51044)
(DE86-004851; GA-A-18149; CONF-8509192-5) Avail: NTIS HC A03/MF A01

A review of electron cyclotron heating (ECH) experiments in tokamaks and stellarators is presented. ECH has the desirable properties of easily controlled, highly localized absorption, insensitivity to plasma boundary conditions, and high power density. The behavior of electron cyclotron waves is described by well developed theory, and experimenal determinations of absorption and propagation tend to support the theory. Global energy confinement scalings suggest that the confinement deterioration with increasing auxiliary power found with other heating methods is also found with ECH, with some exceptions. The application of ECH to the generation of plasmas with high poloidal beta, control of MHD activity, noninductive plasma current drive, and measurement of local electron thermal conductivity is discussed. DOE

N86-26215# GA Technologies, Inc., San Diego, Calif.
STABILITY OF ELECTRON CYCLOTRON WAVES IN THE PRESENCE OF STRONG ELECTRON CYCLOTRON HEATING
J. Y. Hsu and C. N. Lashmore-Davies Dec. 1985 11 p Presented at the 5th International Workshop Electron Cyclotron Emission and Electron, San Diego, Calif., 9-12 Nov. 1985 Submitted for publication Prepared in cooperation with United Kingdom Atomic Energy Authority, Culham
(Contract DE-AC03-84ER-53158)
(DE86-004854; GA-A-18241; CONF-8511131-3) Avail: NTIS HC A02/MF A01

This report examines the stability of the O-mode for perpendicular propagation when a certain fraction of the electrons form a hot electron ring. Also considered is the case of a sharp ring simpler to analyze and a diffuse ring which may occur under conditions of strong electron cyclotron heating. In both cases the parallel distribution of velocities is assumed to be Maxwellian. It was discovered that both distributions can be unstable to the O-mode. For the diffuse ring an estimate is made of the temperature of the background thermal plasma required to stabilize the instability. DOE

N86-26216# New Mexico Univ., Albuquerque. Dept. of Chemical and Nuclear Engineering.
OPERATIONAL CHARACTERISTICS OF A HIGH VOLTAGE DENSE PLASMA FOCUS Final Report, 7 May 1982 - 19 Apr. 1985
David M. Woodall Nov. 1985 160 p refs
(Contract F29601-82-K-0075)
(AD-A164298; AFWL-TR-84-119) Avail: NTIS HC A08/MF A01 CSCL 20/9

A high voltage dense plasma focus powered by a single stage Marx bank was designed, built and operated. The maximum bank parameters are: voltage--120 kV, energy--20 kJ, short circuit current--600kA. The bank impedance is about 200 millohms. The

plasma focus center electrode diameter is 1.27 cm. The outer electrode diameter is 10.16 cm. Rundown length is about 10 cm, corresponding to a bank quarter period of about 900 millohms ns. Rundown L is about 50 milliohms. The context of this work is established with a review of previous plasma focus theoretical, experimental and computational work and related topics. Theoretical motivation for high voltage operation is presented. The design, construction and operation of this device are discussed in detail. Results and analysis of measurements obtained are presented. Device operation was investigated primarily at 80 kV (9 kJ), with a gas fill of about 1 torr H2, plus 3-5 percent A. The following diagnostics were used: gun voltage and current measurements; filtered, time resolved x ray PIN measurements of the pinch region; time integrated x ray pinhole photographs of the pinch region; fast frame visible light photographs of the sheath during rundown; and B probe measurements of the current sheath shortly before collapse. GRA

N86-26217# Beverly (R. E., III) and Associates, Columbus, Ohio.
INVESTIGATION OF THE PLASMA PROPERTIES OF SURFACE DISCHARGES Final Report, 1 Oct. 1984 - 30 Sep. 1985
R. E. Beverly, III 30 Sep. 1985 63 p refs
(Contract DAAG29-84-C-0027)
(AD-A164345; REB85-004; ARO-22480.3-PH-S) Avail: NTIS HC A04/MF A01 CSCL 20/3

Large-area (60-220 sq cm), short-pulse (approx. 1 microsec) planar discharges employing profiled electrodes have been produced across various polymer substrates. Parametric studies of the electrical circuit parameters and discharge dimensions demonstrate the importance of proper source driver impedance matching to short-pulse operation. The degree of spatial homogeneity depends upon the peak discharge voltage, the initial rate of voltage rise, the specific capacitance of the substrate, the gas atmosphere and pressure, and the ablation mode of the substrate. Spectroscopic studies were performed to measure the equivalent brightness temperature, electron temperature, electron density, and optical thickness of smaller-area (24 sq cm) surface discharges across perovskite ceramic substrates. Detailed measurements were conducted with the spectrometer slit image perpendicular and parallel to the substrate surface, with the latter measurements being performed at incremental heights above the surface, with the latter measurements being performed at incremental heights above the surface. The plasma is not opaque in the soft-uv and shows considerable structure due to line emission from neutral and singly-ionized species originating from the gas atmosphere and vaporized substrate material. GRA

N86-26218# Lawrence Livermore National Lab., Calif.
MECHANICAL CONFIGURATION FOR A SUPERCONDUCTING IGNITION TOKAMAK (TIBER)
W. S. Neef, Jr. and B. M. Johnston Jan. 1985 7 p Presented at the 11th Symposium on Engineering Problems in Fusion Research, Austin, Tex., 18 Nov. 1985
(Contract W-7405-eng-48)
(DE86-002965; UCRL-92528; CONF-851102-3) Avail: NTIS HC A02/MF A01

The Lawrence Livermore National Laboratory is evaluating the engineering feasibility and economics of a superconducting ignition tokamak. Two major operational requirements had to be satisfied: (1) the conductive heat leak to the refrigerated structure had to be minimized, and 2) assembly and maintenance of the entire experiment had to be possible with remotely operated tools. The middle poloidal push coil must have many annular disks to transfer the TF-coil inward force to the post without crushing the superconductor. The topping moment on the TF-coil vertical legs is huge. A method of keying together the TF-coil cases has been developed. This forms an integrated structure that resists torque. The joining technique permits linear motion for simple assembly/disassembly. The topping moment on the outer vertical legs of the TF coils is very large. To react that moment and avoid great coil-case bulk, a method has been developed that allows the PF coil support structure to assist the TF case structure. Finite element techniques were used to determine the ability of the coal case and conductor to react the magnetic loads. The entire cold-coil structure is mounted on a circular plate that is suspended by several large tension rods, similar to the MFTF-B yin-yang support rods. The vacuum vessel is all at room temperature and is configured like a bell jar with sixteen side doors, one for each shield module. DOE

N86-25546# Joint Publications Research Service, Arlington, Va.
SPECTROSCOPIC OBSERVATIONS OF THE LINE STARK BROADENING IN THE ULTRAVIOLET VACUUM IN LASER-PRODUCED PLASMAS Abstract Only
Yongchang Wang, E. Jannitti, and G. Tondello *In its* China Report: Science and Technology (JPRS-CST-86-001) 17 Jan. 1986 p 99 Transl. into ENGLISH from Wuli Xuebao (Beijing, China), v. 34, no. 8, Aug. 1985 p 1049-1055 (For primary document see N86-25539 16-31)
Avail: NTIS HC A06/MF A01

N86-25609# Joint Publications Research Service, Arlington, Va.
DESIGN OF PNEUMOHYDRAULIC ACCUMULATORS WITH HIGH-COMPRESSIBILITY ENERGY STORING MEDIUM Abstract Only
S. G. Telitsa and L. M. Vinogradov *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 31 Transl. into ENGLISH from Izvestiya Vysshikh Uchebnykh Zavedeniy: Energetika (Minsk, USSR), no. 11, Nov. 1984 p 95-97 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-25637# Joint Publications Research Service, Arlington, Va.
ANALYSIS OF FREQUENCY CHARACTERISTICS OF MULTI-LAYER CYLINDRICAL SHELLS ON BASIS OF VARIOUS THEORIES Abstract Only
Y. M. Griorenko, Ye. I. Bespalova, and T. N. Kilina *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-002) 7 Feb. 1986 p 87 Transl. into ENGLISH from Prikladnaya Mekhanika (Kiev, USSR), v. 20, no. 12, Dec. 1984 p 52-58 (For primary document see N86-25599 16-31)
Avail: NTIS HC A06/MF A01

N86-26128# Joint Publications Research Service, Arlington, Va.
TWO-DIMENSIONAL MHD-TURBULENCE: HIERARCHICAL MODEL Abstract Only
P. G. Frik *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 20-21 Transl. into ENGLISH from Magnitnaya Gidrodinamika (Riga, USSR), no. 3, Jul. - Sep. 1984 p 48-54 Original language document was announced in IAA as A85-11824 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26129# Joint Publications Research Service, Arlington, Va.
UNSTEADY MHD FLOW IN ANNULAR CHANNEL OF A RADIAL MAGNETIC FIELD Abstract Only
M. Ya. Antimirov and A. A. Kolyshkin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 21 Transl. into ENGLISH from Magnitnaya Gidrodinamika (Riga, USSR), no. 3, Jul. - Sep. 1984 p 76-78 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26130# Joint Publications Research Service, Arlington, Va.
PLASMA CONFINEMENT IN L-2 STELLARATOR WITH OHMIC HEATING Abstract Only
I. S. Shpigel *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 23 Transl. into ENGLISH from Fizika Plazmy (Moscow, USSR), v. 11, no. 1, Jan. 1985 p 13-23 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26139# Joint Publications Research Service, Arlington, Va.
PLASMA-EMISSION ENERGY CONVERSION Abstract Only
I. V. Kirsanov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 37 Transl. into ENGLISH from Preprint no. 41, Institut Obshchey Fiziki an SSSR. Fizika Plazmy, Academy of Sciences (USSR), Moscow, USSR, 1984 (For

primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26140# Joint Publications Research Service, Arlington, Va.
CYCLOTRON ABSORPTION OF A FAST MAGNETOSONIC WAVE IN A STELLARATOR Abstract Only
L. M. Kovriznhykh and P. Ye. Moroz *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 38-39 Transl. into ENGLISH from Preprint no. 120, Institut Obshchey Fiziki an SSSR. Fizika Plazmy, Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26141# Joint Publications Research Service, Arlington, Va.
SUPERRADIANCE IN AN UNDULATOR IN DUAL RESONANCE MODE Abstract Only
L. S. Bogdankevich, L. K. Gelkhviidze, V. S. Ivanov, S. I. Krementsov, M. D. Rayzer, A. A. Rukhadze, and A. V. Fedotov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 39 Transl. into ENGLISH from Preprint no. 151, Institut Obshchey Fiziki an SSSR: Fizika Plazmy, Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26142# Joint Publications Research Service, Arlington, Va.
TWO-DIMENSIONAL PLASMA FLOWS IN A CURRENT LAYER ACCORDING TO RESULTS OF SPECTRAL MEASUREMENTS Abstract Only
N. P. Kirty, V. S. Markov, M. M. Savchenko, and A. G. Frank *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 40 Transl. into ENGLISH from Preprint no. 193, Institut Obshchey Fiziki an SSSR. Fizika Plazmy, Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26143# Joint Publications Research Service, Arlington, Va.
RADIATION SUPERCOOLING OF BULK-IONIZED PLASMA OF MULTIPLY CHARGED IONS Abstract Only
F. V. Bunkin, V. I. Derzhiyev, S. A. Mayorov, and S. I. Yakovlenko *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 41 Transl. into ENGLISH from Preprint no. 221, Institut Obshchey Fiziki, Laboratoriya Volnovykh Yavleniy, Academy of Sciences (USSR), Moscow, USSR, 1984 221, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26144# Joint Publications Research Service, Arlington, Va.
AMPLIFICATION OF LIGHT AT H-ION TRANSITIONS DURING FREE EXPANSION OF THIN CYLINDRICAL PLASMOIDS (ADIABATIC EXPANSION) Abstract Only
A. V. Borovskiy, V. V. Korobkin, and Ch. K. Mukhtarov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 42 Trans. into ENGLISH from Priprint no. 157, Institut Obshchey Fiziki, Laboratoriya Volnovykh Yavleniy, Academy of Sciences (USSR), Moscow, USSR, 1984 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26145# Joint Publications Research Service, Arlington, Va.
BRANCHES OF THERMAL PHYSICS AND APPLICATIONS DISCUSSED Abstract Only
S. Kutateladze *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 44 Transl. into ENGLISH from NTR: Problmy i Resheniya (Moscow, USSR), 2-15 Jul. 1985 p 6 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26148# Joint Publications Research Service, Arlington, Va.
HYDRODYNAMICS OF PLASMA COMPRESSION WITH A MAGNETIC FIELD BY A THIN CYLINDRICAL WALL Abstract Only
A. L. Velikovich, S. M. Golberg, M. A. Liberman, and F. S. Felber *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 47 Transl. into ENGLISH from Zhurnal Eksperimentalnoy i Teoreticheskoy Fiziki (Moscow, USSR), v. 88, no. 2, Feb. 1985 p 445-459 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26149# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF CURRENT GENERATION BY LOWER HYBRID WAVES IN A T-7 TOKAMAK Abstract Only
V. V. Alikayev, Yu. V. Grozdkov, Y. Dyatlov, F. Zhachek, D. P. Ivanov, N. V. Ivanov, V. I. Ilin, A. M. Kakurin, A. Ya. Kislov, and R. Klima *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 48 Transl. into ENGLISH from Fizika Plazmy (Moscow, USSR), v. 11, no. 1, Jan. 1985 p 53-61 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26150# Joint Publications Research Service, Arlington, Va.
LASER-DRIVEN X-RAY EMISSION FROM A PLASMA FOCUS Abstract Only
V. A. Gribkov, S. Denus, A. V. Dubrovskiy, A. I. Isakov, N. V. Kalachev, O. N. Krokhin, V. Ya. Nikulin, S. Sledzinskiy, and S. Chekay *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 50 Transl. into ENGLISH from Fizika Plazmy (Moscow, USSR), v. 11, no. 1, Jan. 1985 p 117-122 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

N86-26151# Joint Publications Research Service, Arlington, Va.
PROGRESS IN CONTROLLED FUSION RESEARCH DESCRIBED
L. Sorin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 51-52 Transl. into ENGLISH from Moskovskaya Pravda (Moscow, USSR), 24 Nov. 1985 p 2 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N86-26219# Cornell Univ., Ithaca, N.Y. Dept. of Materials Science and Engineering.
SUMMARY OF RECENT RESEARCH ON MECHANICAL BEHAVIOR OF POLYCRYSTALLINE SOLIDS Progress Report, Mar. 1985 - Mar. 1986
C. Y. Li Nov. 1985 70 p
(Contract DE-FG02-84ER-45055)
(DE86-004635; DOE/ER-45055/15) Avail: NTIS HC A04/MF A01

This report covers recent research on the mechanical properties of polycrystalline solids in the following areas: load relaxation studies of solute-dislocation interactions during strain aging, a state variable approach to grain boundary sliding and related phenomena, mechanical testing at elevated strain rates, and finite element modeling of nonelastic deformation process by using state variable constitutive relations. DOE

N86-26220# Brown Univ., Providence, R. I. Dept. of Chemistry.
PREPARATION AND CHARACTERIZATION OF ALUMINA FILMS BY SOL-GEL METHOD
R. Brusasco, R. Kershaw, J. Baglio (GTE Labs., Inc., Waltham, Mass.), K. Dwight, and A. Wold 29 Jan. 1986 10 p refs Submitted for publication Sponsored in part by NSF, Washington, D.C.
(Contract N00014-77-C-0387)
(AD-A163548; TR-38) Avail: NTIS HC A02/MF A01 CSCL 20/12

The method of producing a good dielectric layer such as Al2O3

on a III-V semiconductor such as InP is limited by the thermal stability of the substrate. Since InPis reported to be stable only up to about 360 C (1), low temperature synthetic methods must be employed to produce insulating films. A low temperature sol-gel method was used to apply a thin film of alumina on indium phosphide substrates by spin application. The resultant films were characterized by ellipsometry and electron microscopy to determine thickness and porosity. The current-voltage characteristics of the films were measured as a function of annealing temperature. GRA

N86-26221# Wisconsin Univ., Madison. Dept. of Physics.
THIN SUPERCONDUCTING FILM CHARACTERIZATION BY SURFACE ACOUSTIC WAVES Research Progress Report, 30 Sep. 1984 - 30 Sep. 1985
Moises Levy 20 Dec. 1985 16 p refs
(Grant AF-AFOSR-0350-84)
(AD-A164004; AFOSR-86-0007TR) Avail: NTIS HC A02/MF A01 CSCL 20/3

Both the dc electrical resistivity and the attenuation of surface acoustic waves (SAW) were measured in the superconducting state of a granular lead film, as a function of a perpendicular magnetic field. At 4.2 K the film appears to have an upper critical field of about 60 K Gauss. Bulk ultrasonic measurements were made in the series Er(1-x)Ho (x)Rh4B4. At 15 MHz a broad peak in attenuation, due to a relaxation mechanism associated with the Ho ions, is observed around 10 K. It moves to lower temperatures as x is decreased. An increase in attenuation is observed in the superconducting state of those alloys which are ferromagnetic superconductors. This increase may be due to superconducting screening of crystalline field effects which inhibit spin phonon interaction in the normal state. Preliminary measurements of the acoustoelectric coupling of SAW with an Al granular film, which is held 15 micron's above the SAW, indicate that at 19 MHz the attenuation increases when the film becomes superconducting. This is an unexpected result since at this frequency the attenuation is expected to decrease when the film becomes superconducting. GRA

N86-26222# Massachusetts Inst. of Tech., Cambridge.
FEEDFORWARD CONTROL OF WAVES IN LATTICE ELEMENTS Technical Report, 1 Feb. - 1 Aug. 1985
James H. Williams, Jr., Gregory A. Norris, and Samson S. Lee 1 Aug. 1985 74 p refs
(Contract F49620-83-C-0092)
(AD-A164009; AFOSR-85-1233TR) Avail: NTIS HC A04/MF A01 CSCL 20/11

The motion in a lattice substructural element, within which longitudinal stress waves propagate nondispersively and without attenuation, is assumed to be governed by the classical wave equation. A feedforward controller configuration is proposed to isolate a portion of the substructure from longitudinal wave disturbances. The governing equations for the propagation of incoming and controller-generated stress waves in the substructure are determined. To prevent instability, the controller must respond to incoming stress waves only, disregarding self-generated outgoing waves. The transfer function for the controlled substructure system is derived. The dependence of the transfer function magnitude on the input waveform frequency as well as on controller error parameters is demonstrated. The ranges of acceptable controller error are determined for the operational goals of disturbance cancellation and disturbance amplitude attenuation. GRA

N86-26223# Spire Corp., Bedford, Mass.
EPITAXIAL (100) GaAs THIN FILMS ON SAPPHIRE FOR SURFACE ACOUSTIC WAVE/ELECTRONIC DEVICES Final Report, 30 Sep. 1984 - 28 May 1985
Victor E. Haven, Jr. Dec. 1985 32 p refs
(Contract F49620-84-C-0108)
(AD-A164252; SPIRE-FR-60057; AFOSR-86-0006TR) Avail: NTIS HC A03/MF A01 CSCL 20/12

In the past year it has been demonstrated that undoped <111> single crystal gallium arsenide could be grown on <0112> sapphire using the metalorganic chemical vapor deposition (MO-CVD) growth technique. An interesting and unexpected result from this work was that the GaAs films grown had a <111> orientation instead of the proposed <100> orientation. GRA

N86-26224# M/A-COM, Inc., Burlington, Mass.
X-BAND GaAs ISIS (INTEGRATED SERIES IMPATT STRUCTURES) IMPATTS Final Report
Rovindra Dat and Murthy Ayyagari Jul. 1985 72 p refs
(AD-A164380) Avail: NTIS HC A04/MF A01 CSCL 09/1

The underlying purpose of this nine month program was to demonstrate the feasibility of synergistic power in Gallium Arsenide Integrated Series IMPATT Structures (ISIS). In order to demonstrate such a feasibility, the program entailed the following: Task 1: (1) Designing of appropriate doping profiles for GaAs X-band ISIS diodes; (2) Growing Integrated Series IMPATT Structures using Vapor Phase Epitaxy (VPE); and (3) Characterizing the doping profiles of the ISIS wafers. Task 2: (1) Processing ISIS wafers grown by VPE into single mesa diodes with integral heat sinks; (2) Processing ISIS wafers grown by Molecular Beam Epitaxy (to be provided by NRL) into single mesa diodes with integral heat sinks; and (3) Assembling diodes of (1) and (2) into standard packages compatible with coaxial mounts. GRA

N86-26225# Department of the Navy, Washington, D. C.
METHOD OF FORMING THERMALLY STABLE HIGH RESISTIVITY REGIONS IN n-TYPE INDIUM PHOSPHIDE BY OXYGEN IMPLANTATION Patent Application
Phillip E. Thompson, inventor (to Navy) and Harry B. Dietrich, inventor (to Navy) Filed 12 Dec. 1985 13 p
(AD-D012159; US-Patent-Appl-SN-808699) Avail: NTIS HC A02/MF A01 CSCL 09/1

Objects of this invention are: to form high temperature stable isolation regions in InP; to provide InP wafers which allow greater flexibility in the design and fabrication of discrete devices; to provide new and improved InP semiconductor devices in n-type InP; to provide high resisitivity isolation regions in InP; to extend the usefulness of damage-induced isolation in n-type InP by making possible processes in which the isolation implantation precedes the alloying of ohmic contacts; and to provide n-type InP substrates without unwanted conductive layers. The above and other object are realized by an InP wafer comprising a S.I. InP substrate; a n-type InP active layer disposed on the substrate; and oxygen ion implanted isolation regions disposed in the active layer. The S.I. InP dopant may comprise either Fe or Cr. GRA

N86-26226# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
EXAMINATION OF MILLIMETER-WAVE PERFORMANCE POTENTIAL OF MODULATION DOPED AlGaAs/GaAs FET STRUCTURES Final Technical Report, 1 Jul. 1983 - 30 Jun. 1984
Mukunda B. Das Sep. 1985 42 p refs
(AD-A163152; AFWAL-TR-85-1082) Avail: NTIS HC A03/MF A01 CSCL 20/12

This investigation involved a critical examination of the millimeter-wave performance requirements of the modulation-doped n-AlGaAs/GaAs FET structures. The results of this study revealed the need for a high aspect ration design for the gate structure of MODFET's for millimeter-wave performance. A detailed design procedure has also been developed for submicron gate-length MODFET's, determination of carrier saturation velocity, and power gain and noise figure performance of MODFET's. GRA

N86-26227# Universidad Autonoma de Madrid (Spain). Dept. De Fisica Del Estado Solido.
THEORETICAL CALCULATIONS SUPPORTING INVESTIGATION OF METAL CONTACTS TO ULTRA-SMALL SEMICONDUCTOR STRUCTURES
F. Flores, G. Platero, J. Sanchez-Dehesa, C. Tejedor, and J. A. Verges Oct. 1985 86 p
(Contract DAJA45-84-M-0378)
(AD-A163160) Avail: NTIS HC A05/MF A01 CSCL 20/12

Metal-ultrasmall superlattice junctions have been analyzed by using a consistent tight-binding method. Heterojunctions and

metal-semicondictor interfaces have been discussed independently by assuming that each semiconductor superlayer has more than six layers. We present results for the electronic structure of (100)-semiconductor heterojunctions; in particular, we consider the (100)-GaAs-AlAs, GaSb-InAs and InAs-GaSb interfaces. For GaAs-AlAs we have found that the valence band offset is 0.41 eV, and that there is an interface dipole of 0.13 eV (for no interface dipole, the valence band offset would be of 0.28 eV). Our results also show that the two GaSb-InAs and InAs-GaSb interfaces present different band-offset discontinuities. We have also analysed the initial stages of the Schottky-barrier formation for Al on an As-terminated GaAs-(100) face. Two cases have been analyzed: (1) we have considered a half monolayer of Al, with these atoms located in the ideal position corresponding to a Ga-atom of the ideal continued GaAs crystal; (2) we have considered a full monolayer with the Al atoms forming a (100)-face of an Al crystal. GRA

N86-26228# Department of the Army, Washington, D. C.
A NONDESTRUCTIVE NONCONTACT DEVICE TO CHARACTERIZE SEMICONDUCTOR MATERIAL Patent Application
C. G. Walker, Inventor (to Army) and G. A. Tanton, Inventor (to Army) Filed 7 Feb. 1985 7 p
(AD-D011659; US-Patent-Appl-SN-699282) Avail: NTIS HC A02/MF A01 CSCL 14/2

A semiconductor single crystal wafer is positioned in a magnetic field. A computer initializes the light level and the electronic gain of each detector reamp associated with a fiber optic link from the analyzer. The magnetic field direction would then be reversed by computer command. This would cause a localized change in intensity of light passing through the wafer, due to Faraday Rotation. The resulting change in detector output together with location and wavelength data could be used to compute a map of the wafer. Author (GRA)

N86-26229# National Bureau of Standards, Washington, D.C.
TOPOLOGY OF LOCAL ATOMIC ENVIRONMENTS: IMPLICATIONS FOR MAGNETISM AND SUPERCONDUCTIVITY
L. H. Bennet, R. E. Watson, and W. B. Perason 15 Apr. 1985 9 p Presented at the International Conference on Magnetism, San Francisco, Calif. 26 Aug. 1985 Prepared in cooperation with Brookhaven National Lab., Upton, N.Y. and Waterloo Univ., Ontario
(Contract DE-AC02-76CH-00016)
(DE86-002933; BNL-37171; CONF-850890-25) Avail: NTIS HC A02/MF A01

Wigner-Seitz cells have been constructed, as a function of atomic size, for a number of transition-metal alloys (SmCo5 etc.) and a disclination network has been obtained from these. Magnetism in these alloys can be related to the disclination lines, much like the superexchange paths familiar in the magnetism of salts. DOE

N86-26230# Los Alamos National Lab., N. Mex.
MOSSBAUER EFFECT STUDIES AT PRESSURES TO 300 KBAR
R. D. Taylor 1985 3 p Presented at the Raymond and Beverly Sackler Distinguished Lectures, Tel Aviv, Israel, 5 May 1985
(Contract W-7405-eng-36)
(DE86-002402; LA-UR-85-3569; CONF-8505211-1) Avail: NTIS HC A02/MF A01

In a recent experiment a diamond anvil cell was used for a Mossbauer effect absorber experiment. A high-atomic-weight gasket material was developed; it served both to contain the pressure and to collimate the 27.8-keV Mossbauer effect gamma rays and nearby K X-rays emitted from the source. Elemental iodine is known to transform with pressure becoming metallic near 160 kbar. Furthermore, it has been reported that I2 becomes monatomic at about 215 kbar. The Mossbauer effect of iodine-129 was employed to check this latter supposition. The Mossbauer effect fingerprint of I2 was found to change slowly with pressure up to about 160 kbar, whereupon a new high pressure phase or site began to appear. At 300 kbar the Mossbauer spectrum shows about half of the low temperature phase (I2) is still present. This contradiction with X-ray results and or their interpretation is still under investigation. DOE

N86-26231# Oak Ridge National Lab., Tenn.
FLUX-LINE PINNING BY THE GRAIN BOUNDARY IN NIOBIUM BICRYSTALS
H. R. Kerchner, D. K. Christen, E. M. Lee, A. DasGupta, B. C. Cai, and Y. T. Chou Nov. 1985 5 p Presented at the International Symposium on Flux Pinning and Electromagnetic Properties in Superconductors, Fukuoka, Japan, 11 Nov. 1985 Prepared in cooperation with Lehigh, Univ., Bethlehem, Pa.
(Contract DE-AC05-84OR-21400)
(DE86-003090; CONF-8511126-1) Avail: NTIS HC A02/MF A01

Flux-line pinning by the grain boundary in niobium bicrystals was investigated by making four-terminal measurements of the critical current and neutron diffraction measurements of the flux-line bending. The elementary pinning interaction is estimated from the critical current data by using an approximate theory of the current distribution on the grain boundary. The data reported here are mainly for a sample in which the applied magnetic field is parallel to the [111] and the [001] crystal directions in the two grains when it is in the plane of the boundary and perpendicular to the current direction. Evidence is seen of grain boundary faceting and of a flux-flow rectification effect that peaks as a function of temperature below 3 3 K. The scale of the grain-boundary pinning is consistent with the quasiparticle-scattering theory. DOE

N86-26232# National Academy of Sciences - National Research Council, Washington, D. C.
REPORT ON ARTIFICIALLY STRUCTURED MATERIALS Final Report
1985 136 p
(Contract DE-FG02-81ER-10844; Grant NSF DMR-81-19500)
(PB86-144102) Avail: NTIS HC A07/MF A01 CSCL 20L

Advances in high-vacuum and semiconductor growth techniques have made it possible to tailor-make materials one atomic layer at a time. In this way materials not occurring in nature, with particularelectrical, magnetic optical, or mechanical properties ultimately may be designed and fabricated. The report describes the types of materials used, concentrating on GaAs and GaAlAs compounds; the structures involved, such as superlattices and heterostructures; the scientific opportunities in, for example, superconductor and semiconductor technologies; and the applications possible with ASMs. The report discusses the various fabrication, diagnostic, and characterization methods used in the production of ASMs. Finally, the report lists some of the difficulties confronting researchers, such as the need for easily-available, high-purity samples, and state-of-the-art equipment to fabricate ASMs. The report makes recommendations for federal funding support to allow the U.S. to maintain the lead in this field. GRA

N86-26233# National Bureau of Standards, Gaithersburg, Md. Reactor Radiation Div.
NBS LATTICE: A PROGRAM TO ANALYZE LATTICE RELATIONSHIPS, VERSION OF SUMMER, 1985 Final Report
V. L. Himes and A. D. Mighell Dec. 1985 84 p
(PB86-166774; NBS/TN-1214) Avail: NTIS HC A05/MF A01 CSCL 20B

A FORTRAN program to analyze lattice relationships has been written and is available for distribution by the NBS Crystal Data Center. The present version of NBS *LATTICE performs several functions including: (1) the characterization and identification of unknown materials using lattice-formula matching techniques; (2) the calculation of the reduced cell of the lattice, and the calculation and reduction of specified derivative supercells and/or subcells (i.e., this program function calculates the standard cells which are useful in the determination of metric lattice symmetry in finding a matrix relating two unit cells, etc.); (3) unit cell transformations; and (4) matrix inversions. It is planned to incorporate additional functions in forthcoming versions of this program. Among others, these functions will include a matrix method to determine

metric lattice symmetry and a technique to find a transformation matrix relating any two unit cells. GRA

N86-26109# Joint Publications Research Service, Arlington, Va.
FAST METHOD OF GROWING CRYSTALS FOR NONLINEAR OPTICS Abstract Only
In its USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 1 refs Transl. into ENGLISH from NTR: Problemy i Resheniya (Moscow, USSR), 18 Jun. - 1 Jul. 1985 p 4 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26110# Joint Publications Research Service, Arlington, Va.
SUBMILLIMETRIC-WAVE LUMINESCENCE OF CdS SINGLE CRYSTALS DURING OPTICAL PUMPING Abstract Only
Yu. A. Mityagin, V. N. Murzin, and S. A. Stoklitskiy *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 2 refs Transl. into ENGLISH from Kratkiye Soobshcheniya Po Fizike (Moscow, USSR), no. 5, May 1985 p 28-31 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26111# Joint Publications Research Service, Arlington, Va.
STIMULATED MANDELSTAM-BRILLOUIN SCATTERING IN CRYSTALS Abstract Only
M. Sattikulov, V. V. Demanov, and V. A. Muminov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 3 Transl. into ENGLISH from Izvestiya Akademii Nauk UZ SSR. Seriya Fiziko-Matematicheskikh Nauk (Tashkent, USSR), no. 1, Jan. - Feb. 1985 p 74-78 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26115# Joint Publications Research Service, Arlington, Va.
PROCESSES OF EXCITATION AND RELAXATION BY Nd SUP 3+ IN CERTAIN SEMICONDUCTOR MATRICES Abstract Only
Arzu Ali ogly Mamedov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 5 Transl. into ENGLISH from Akademiya Nauk SSSR Institut Obshchey Fiziki Dissertation Abstracts (Moscow, USSR) (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26116# Joint Publications Research Service, Arlington, Va.
EFFECT OF DIFFUSION CONSTRAINTS ON COMPOSITION OF VAPOR PHASE DURING GROWTH OF CdS AND ZnSe CRYSTALS Abstract Only
Ye. I. Panasyuk, M. S. Kleybanov, A. D. Levit, and V. K. Yakushin *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 6 Transl. into ENGLISH from Kratkiye Soobshcheniya Po Fizike (Moscow, USSR), no. 6, Jun. 1985 p 6-9 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05/MF A01

N86-26152# Joint Publications Research Service, Arlington, Va.
MOVING SOLITONS IN SUPERCONDUCTORS AND PEYERLS SYSTEMS Abstract Only
S. V. Panyukov *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 53 Transl. into ENGLISH from Kratkiye Soobshcheniya po Fizike (Moscow, USSR), no. 5, May 1985 p 56-59 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N86-26234# National Bureau of Standards, Gaithersburg, Md.
THERMODYNAMICS OF HIGH TEMPERATURE MATERIALS
Annual Report, 1 Oct. 1984 - 30 Sep. 1985
Stanley Abramowitz 24 Dec. 1985 125 p refs
(Grant AFOSR ISSA 78-00029)
(AD-A164253; AFOSR-86-0008TR) Avail: NTIS HC A06/MF A01 CSCL 11/2

A report on the thermodynamics of high temperature materials includes the following: Research on Thermophysical Properties; High Temperature Enthalpy Measurements; Broad Band Spectroscopy of Small Molecules in Intense Laser Fields; Growth and Decomposition of Graphitic Structure; Build Up and Irradiation of Obscuring Clouds Under Near Vacuum Conditions Application to Spacecraft Survivability; and Molecular Basis for Laser Induced Vaporization of Refractory Materials. Author (GRA)

N86-26235# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THERMAL CALCULATION OF A THERMOGENERATOR AT CHANGING TEMPERATURES ALONG THERMOCONTACT SURFACES
G. A. Varshavskiy and Rezgol, I. A. 13 Jan. 1986 16 p refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Energetika i Transport (USSR), v. 64, no. 6, 1964 p 735-742
(AD-A164320; FTD-ID(RS)T-1218-85) Avail: NTIS HC A02/MF A01 CSCL 20/13

The article finds expressions for the output power of efficiency of a thermoelectric generator and temperature distribution along the heat carrier under the condition that temperatures of the thermocontact surfaces vary due to the cooling and heating of the heat carriers. Simple approximation calculation formulas are given for the particular cases examined. This work is devoted to the finding of analytical bonds, which make it possible to make the calculation of the thermogenerator at changing (as a result of heat transfer) temperatures of the solderings. The obtained expressions can be useful in the preliminary determination of the optimal parameters of the generators (maximal power and efficiency, minimal weight, etc.) and an analysis of processes of regulation. GRA

N86-26236# Stanford Linear Accelerator Center, Calif.
GAUGE INVARIANCE OF STRING FIELDS
T. Banks and M. E. Peskin Oct. 1985 6 p refs Presented at the Workshop on Unified String Theories, Santa Barbara, Calif., 29 Jul. 1985 Sponsored by Stanford Linear Accelerator Center, Calif. Prepared in cooperation with Tel-Aviv Univ., Isreal
(Contract DE-AC03-76SF-00515)
(DE86-002937; SLAC-PUB-3802; CONF-850798-3; CONF-8508151-1) Avail: NTIS HC A02/MF A01

Some work done to understand the appearance of gauge bosons and gravitons in string theories is reported. An action has been constructed for free (bosonic) string field theory which is invariant under an infinite set of gauge transformations which include Yang-Mills transformations and general coordinate transformations as special cases. DOE

N86-26154# Joint Publications Research Service, Arlington, Va.
NONLINEAR PROPAGATION OF SPATIALLY BOUNDED TRANSVERSE WAVES THROUGH ISOTROPIC SOLID MEDIUM
Ye. A. Zabolotskaya *In its* USSR Report: Physics and Mathematics (JPRS-UPM-86-001) 21 Jan. 1986 p 58-59 Transl. into ENGLISH from Kratkiye Soobshcheniya po Fizike (Moscow, USSR), no. 6, Jun. 1985 p 43-47 (For primary document see N86-26108 16-70)
Avail: NTIS HC A05

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N86-26237# Naval Postgraduate School, Monterey, Calif.
AN ANALYSIS OF QUANTITY-SPLIT AND NONRECURRING COSTS UNDER COMPETITIVE PROCUREMENT ENVIRONMENT Final Report, Jan. - Sep. 1985
Dan C. Boger and Shu S. Liao Sep. 1985 77 p
(AD-A163028; NPS54-85-08) Avail: NTIS HC A05/MF A01 CSCL 05/1

This study addresses two important issues related to establishing a second source and managing a program under dual source competition. The first relates to the issue of estimating nonrecurring costs. The second relates to the issue of dual award quantity-split in order to maintain a competitive environment. In dual sourcing decisions, it is necessary that the nature and extent of prospective second source's nonrecurring costs be fully analyzed. Nonrecurring costs are important since they represent those investment costs which must be incurred before the second source produces any output. Several nonrecurring cost estimation models, both parametric and nonparametric, are examined. Five different quantity-split models are analyzed to evaluate each model's strength and weakness in cost performance and its ability to cope with contractor gamesmanship. GRA

N86-26238# George Mason Univ., Fairfax, Va. Technology Transfer Study Center.
TECHNOLOGY TRANSFER AT THE DEFENSE ADVANCED RESEARCH PROJECTS AGENCY: A DIAGNOSTIC ANALYSIS
Ronald G. Havelock and David S. Bushnell Dec. 1985 90 p
(Contracts MDA903-84-K-0031; ARPA Order 5156)
(AD-A164457) Avail: NTIS HC A05/MF A01 CSCL 05/1

Five technology transfer issues have been identified as relevant to the DARPA mission. (1) Transfer within Programs: Intra-program transfer describes what DARPA program managers do on a day-to-day basis and typically involves seven strategies: enlisting the best talent; encouraging social interaction; encouraging interinstitutional linkages; providing adequate and sustained fiscal support; concern for downstream applications; promoting creativity; supporting innovations which strengthen the R&D system. (2) Transfer of the Military: (3) Domestic Spin-off: (4) Technical Knowledge Containment: All DARPA's contractors share a great concern for the security issue, but few if any are able to propose viable countermeasures. There is a general fear that new restrictions on communication within the DARPA network would reduce creativity and productivity and might thus have a net negative effect on the Nation's standing as a technology leader. (5) Transfer into DARPA from Other Sources: DARPA has no reliable process for acquiring new ideas from sources outside the DARPA contractor pool. Better intelligence is needed on what is going on both in the U.S. and in foreign countries including the Soviet Bloc. GRA

N86-26239# National Bureau of Standards, Gaithersburg, Md. Center for Basic Standards.
TECHNICAL ACTIVITIES 1983, CENTER FOR BASIC STANDARDS
K. G. Kessler Oct. 1985 331 p
(PB86-140043; NBSIR-85/3254) Avail: NTIS HC A15/MF A01 CSCL 14B

The research and technical activities of the Center for Basic Standards during the Fiscal Year 1985 are summarized. These activities include work in the areas of electricity, temperature and pressure, mass and length, time and frequency, quantum metrology, and quantum physics. GRA

N86-26240# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Science, Eng. and Public Policy.
RESEARCH BRIEFINGS FOR THE OFFICE OF SCIENCE AND TECHNOLOGY POLICY, THE NATIONAL SCIENCE FOUNDATION AND SELECTED FEDERAL DEPARTMENTS AND AGENCIES, 1985 Annual Report
1985 112 p Sponsored by National Academy of Sciences - National Research Council, Washington, D. C.
(Grant NSF STI-85-01382)
(PB86-148582; ISBN-0-309-03585-6; LC-85-61729) Avail: NTIS HC A06/MF A01 CSCL 06E

In 1982 the Office of Science and Technology Policy (OSTP) asked the National Academy complex to develop a series of briefings aimed at identifying research areas of unusual scientific opportunity within specific fields of science. The first set of briefings covered seven fields, and was presented in both oral and written form to senior officials of OSTP and the National Science Foundation (NSF) in late 1982. The briefings were presented subsequently to senior officials of other interested federal departments and agencies, and published as a collection by the National Academy Press. Responsibility for developing the briefings was given to the Committee on Science, Engineering, and Public Policy (COSEPUP), a joint unit of the National Academies of Science, Engineering, and the Institute of Medicine. Thus began the program of annual research briefings that with the publication of the volume will have completed four rounds and covered 28 topics. GRA

N86-26241# National Bureau of Standards, Gaithersburg, Md. Center for Programming Science and Technology.
GUIDE ON SELECTING ADP (AUTOMATIC DATA PROCESSING) BACKUP PROCESSING ALTERNATIVES Final Report
I. E. Isaac Nov. 1985 43 p refs
(PB86-154820; NBS/SP-500/134; LC-85-600618) Avail: NTIS HC A03/MF A01; also available SOD HC $1.75 as SN003-003-02701-4 CSCL 05A

The publication addresses the issue of selecting ADP backup processing support in advance of events that cause the loss of data processing capability. The document emphasizes the need for managers at all levels of the organization to support the planning, funding, and testing of an alternate processing strategy. It provides a general description of the alternatives, and recommends criteria for selecting the most suitable alternate processing method. GRA

N86-26242# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Res
PROCEEDINGS OF A RESEARCH PLANNING CONFERENCE ON ENGINEERING ECONOMICS HELD AT MOUNTAIN LAKE, VIRGINIA ON AUGUST 26-29, 1984
1985 192 p Conference held in Mountain Lake, Va., 26-29 Aug. 1984 Sponsored by NSF
(PB86-163045; NSF/ENG-85049) Avail: NTIS HC A09/MF A01 CSCL 05A

The conference was held to address the complex economic decisions facing American industry due to the rapid advance in new design and manufacturing technologies. A major objective was to produce a rank-ordered list of research projects on engineering economics. A list of conference participants, representing both academia and industry, is provided. Reports of two previous workshops-one on Economic Decision Analysis and the other on Economics in Engineering Systems-are included. GRA

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N86-26243*# National Aeronautics and Space Administration, Washington, D.C.
SIGNIFICANT NASA INVENTIONS AVAILABLE FOR LICENSING IN FOREIGN COUNTRIES
1986 81 p
(NASA-SP-7038(08); NAS 1.21:7038(08)) Avail: NTIS MF A01; SOD HC $5.00 as 033-000-00986-1 CSCL 05B

Abstracts of various NASA-owned inventions which are available for foreign licensing in the identified countries are listed in accordance with the NASA Patent Licensing Regulations. Instructions for requested applications are explained. B.G.

N86-26244# Los Alamos National Lab., N. Mex.
FILE STRUCTURE USE IN INGRES DATABASES AT LOS ALAMOS NATIONAL LABORATORY
S. C. Hench 1985 13 p Presented at the INGRES Users Group National Conference, San Diego, Calif., 1985
(Contract W-7405-eng-36)
(DE86-002405; LA-UR-85-3704; CONF-8510240-1) Avail: NTIS HC A02/MF A01

This paper presents an analysis of the different file structures used in over 300 INGRES databases at Los Alamos National Laboratory. It also discusses the relationships between file structures and performance. DOE

N86-26245# Oak Ridge National Lab., Tenn.
CARBON DIOXIDE INFORMATION CENTER FY 1985 Progress Report
M. P. Farrell Nov. 1985 59 p
(Contract DE-AC05-84OR-21400)
(DE86-004654; ORNL/CDIC-11) Avail: NTIS HC A04/MF A01

The Carbon Dioxide Information Center (CDIC) has eight major functions: (1) distribute DOE and CDIC publications; (2) publish a CO2 document, CDIC communications; (3) respond to information requests; (4) develop a bibliographic information system and provide searching capabilities; (5) identify the CO2 research community and policymakers and provide access to a computerized world directory; (6) evaluate and test computer codes and package the models; (7) compile and evaluate numeric data bases and package the data; and (8) provide networking facilities among other data centers. CDIC progress during FY 1985 in these functions is discussed. DOE

N86-26246*# National Aeronautics and Space Administration, Washington, D.C.
THE LIBRARY SYSTEM OF THE DFVLR: PRESENT STATUS, PLANNED REORGANIZATION, USER POSSIBILITIES
P. Sternemann Oct. 1985 16 p Transl. into ENGLISH of "Das Bibliothekswen der DFVLR derzeitiger Status, gerplante Neurdnung, Nutzungsmologlichkeiten" Rept. DGLR 79-084 Cologne-Porz, West Germany Symposium held in Neubiberg, West Germany, 14 Nov. 1979 Original language document was announced in IAA as A80-44521 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-4004)
(NASA-TM-77674; NAS 1.15:77674; DGLR-79-084) Avail: NTIS HC A02/MF A01 CSCL 05B

This paper gives an overview of the present status, planned alterations, and the scope of users of the DFVLR library, as well as a survey of library related activities outside of the library department. Attention is given to the tasks of the DFVLR which include research, assistance in planning and carrying out projects, and the construction and operation of large test installations, showing how they relate to demands on the library. Author

N86-26247# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
IMPLEMENTATION OF THE AFIT/ENG FACULTY AND STUDENT DATABASE MANAGEMENT SYSTEM M.S. Thesis
David A. Gaitros Dec. 1985 272 p refs
(AD-A164051; AFIT/GCS/ENG/85D-5) Avail: NTIS HC A12/MF A01 CSCL 09/2

This study took the works of the previous AFIT/ENG Student and Faculty Database System thesis efforts and design and implemented the application software for the project. The basic purpose of the thesis was to provide a sound design for the application programs that would interface with the total Database Management System and the Forms Management System. The entire system was to be designed with the notion that it would be modified and enhanced. A series of standard interface routines were created to act as a layer between the TOTAL DBMS. The resulting routines were abstracted and used as an extension to the Pascal programming language. The education plan portion of the database was used as a prototype to develop the requirements of the human-computer interface. The program was then redesigned and implemented using the standard routines and the specifications developed from the prototype. A menu driven system was used to implement the design utilizing the Forms Management System as the screen interface. The education plan program is an example of the structured approach used in interpreting the design of the database system. The program contains examples of scrolled screens, database calls, linked list routines, and data abstraction. Additional programs were written to demonstrate the capabilitiees interfacing with the GKS graphics package, transmission of data to the registrars office, and to show the continuity of the design. GRA

N86-26248# SRI International Corp., Menlo Park, Calif. Ddn Network Information Center.
ARPANET INFORMATION BROCHURE
Stephen Dennett, Elizabeth J. Feinler, and Francine Perillo Dec. 1985 57 p refs
(Contract DCA200-83-C-0025)
(AD-A164353; NIC-50003) Avail: NTIS HC A04/MF A01 CSCL 09/2

The ARPANET is an unclassified, packet-switched data network originally built by the Defense Advanced Research Projects Agency (DARPA) and used for Department of Defense computer science and networking research. It is now one of the subnetworks of the Defense Data Network (DDN) and, as such, is managed by the Defense Data Network Program Management Office (DDN PMO). Policy for the ARPANET is established by DARPA and they also decide who may become subscribers. Subscribers are required to follow certain technical and administrative procedures to connect host computers or other equipment to the DDN. This document describes these procedures as they apply to the ARPANET, provides background and technical information on the ARPANET, and suggests sources of further information on protocol implementations and interface equipment. Author (GRA)

N86-26249# Massachusetts Inst. of Tech., Cambridge. Sea Grant Program.
MARINE-RELATED RESEARCH AT MIT (MASSACHUSETTS INSTITUTE OF TECHNOLOGY): A DIRECTORY OF RESEARCH PROJECTS, 1985-1986
S. D. Stolz Sep. 1985 104 p Sponsored by NOAA
(PB86-158102; MITSG-85-31) Avail: NTIS HC A06/MF A01 CSCL 05B

A report on marine-related research at MIT contains items in the following areas: fisheries and food and drugs from the sea; marine biology; marine mineral resources; alternative energy sources; pollution; oceanography; ocean engineering; ship design and operations; shipping and transportation systems; and marine education. GRA

N86-26250# Arizona State Univ., Tempe. Dept. of Industrial and Management Sys. Eng.
INFORMATION SYSTEMS IN ADOT (ARIZONA DEPARTMENT

OF TRANSPORTATION): ANALYSIS OF INTRA-FUNCTION FLOW, DECISION SUPPORT NEEDS, EXISTING SYSTEMS UTILITY AND USER ATTITUDES. VOLUME 2: MANUAL FOR EVALUATION OF NEEDS AND ATTITUDES OF EDP USERS Final Report

W. C. Moor, J. E. Bailey, P. A. Evans, and A. Roberts Mar. 1985 98 p Sponsored in part by Federal Highway Administration, and by Arizona Dept. of Transportation

(PB86-148699; FHWA/AZ-85/205/2) Avail: NTIS HC A05/MF A01; Also avail. in set of 3 reports HC E99 as PB86-148673 CSCL 05B

A manual is presented to assist in evaluating the needs and attitudes of groups of ISG users. An objective analysis of needs and attitudes is useful when prioritizing or tailoring new application and change requests. The analysis acts as a roadmap indicating the best way to go. This manual describes the methodology of how to interpret the study results and how to administer and compile the results. GRA

N86-26251# Arizona State Univ., Tempe. Dept. of Industrial and Management Sys. Eng.

INFORMATION SYSTEMS IN ADOT (ARIZONA DEPARTMENT OF TRANSPORTATION): ANALYSIS OF INTRA-FUNCTION FLOW, DECISION SUPPORT NEEDS, EXISTING SYSTEMS UTILITY AND USER ATTITUDES, VOLUME 1 Final Report

W. C. Moor, J. E. Bailey, P. A. Evans, and A. Roberts Mar. 1985 66 p Sponsored in part by Federal Highway Administration, Phoenix, Ariz., and by Arizona Dept. of Transportation, Phoenix

(PB86-148681; FHWA/AZ-85/205/1) Avail: NTIS HC A04/MF A01; Also Avail. in set of 3 reports HC E99 as PB86-148673 CSCL 05B

A study of the information activities within the Right-of-Way section of Arizona Dept. of Transportation (ADOT) is presented. The objectives of the study are to adapt and apply techniques to measure user-perceived needs, satisfaction, and utility of services provided right-of-way by the information systems group (ISG). A background of the four tested techniques is given along with a review of related literature. The procedure used to collect and analyze the data collected in right-of-way is discussed. A manual for ISG use of the techniques is offered. GRA

N86-26252# National Academy of Sciences - National Research Council, Washington, D. C.

NAS (NATIONAL ACADEMY OF SCIENCES) EXCHANGES WITH THE ACADEMIES OF SCIENCES OF THE USSR AND EASTERN EUROPE Annual Report, 1984

31 Jan. 1985 101 p

(Grant NSF INT-83-14550)

(PB86-141827) Avail: NTIS HC A06/MF A01 CSCL 05B

The exchange program of the National Academy of Sciences (NAS) and the Academy of Sciences of the USSR (ASUSSR) dates from 1959. Comparable interacademy programs for exchange of individuals were begun with the Poles, Yugoslavs, Romanians, and Chechoslovaks in 1966, with the Bulgarians and Hungarians in 1970, and with the East Germans (GDR) in 1978. The seven East European programs represent approximately two-thirds of total exchange visits; the Soviet program, one third. The interacademy program operated for many years at approximately 330 months of exchange visits in each direction annually. With Federal budget reductions in 1981, support for the Academy's Soviet-East European exchange program, which has come exclusively from the National Science Foundation, was reduced by nearly 50%. At that time, the quotas in all programs were proportionately reduced. GRA

N86-26253# Joint Publications Research Service, Arlington, Va.

USSR REPORT: CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

31 Dec. 1985 44 p refs Transl. into ENGLISH from various Russian articles

(JPRS-UCC-85-010) Avail: NTIS HC A03/MF A01

Reports are included from a variety of periodicals on the topics of computer hardware, software, and applications; computer networks; and theory of computations. For individual titles, see N86-26254 through N86-26258.

N86-26254# Joint Publications Research Service, Arlington, Va.

REAL-TIME ALGORITHM FOR ESTIMATING PARAMETERS OF DOCUMENT INFORMATION SYSTEM Abstract Only

V. N. Belova and V. V. Maksimov *In its* USSR Report: Cybernetics, Computers and Automation Technology (JPRS-UCC-85-010) 31 Dec. 1985 p 20 Transl. into ENGLISH from Nauchno-tekhnicheskaya Informatsita Seriya 2 Informatsionyye Protsessy i Sistemy (Moscow, USSR), no. 7, Jul. 1985 p 13-16 (For primary document see N86-26253 16-82)

Avail: NTIS HC A03/MF A01

A recursive algorithm is described for estimating the parameters of a document information stream based on an optimal discrete Kalman filtering algorithm and the state vector expansion method. The Kalman filtering algorithm provides unbiased, accurate estimates of the state of a discrete dynamic system when a Gaussian Markov state sequence is observed against the background of independent Gaussian random vectors. The proposed algorithm employs prediction correction (each corrected term is added to the predicted term obtained by extrapolating the preceding estimate one step ahead). The problem of estimating the number of documents in an average stream and its rate of increase is analyzed as an example. The algorithm is found to be computationally efficient; however, it requires a priori information about the statistical characteristics of the random stream and the initial estimate of the average stress. Author

N86-26255# Joint Publications Research Service, Arlington, Va.

FORMATION OF DATA BASE FOR METROLOGICAL SERVICES OF MINPRIBOR Abstract Only

A. G. Zotov, M. A. Golovahkin, M. M. Klochkov, and H. G. Sherstyukov *In its* USSR Report: Cybernetics, Computers, and Automation Technology (JPRS-UCC-85-010) 31 Dec. 1985 p 23 Transl. into ENGLISH from Izmeritelnaya Tekhnika (Moscow, USSR), no. 6, May 1985 p 65-67 (For primary document see N86-26253 16-82)

Avail: NTIS HC A03/MF A01

A sectoral metrological service , developed by the Ministry of Instrument Making, Automation Equipment, and Control Systems (MINPRIBOR) , defines the organizational and methodological bases of metrology for design, production, and operation of goods. An automated Metrology block with its data base forms part of the automated control system. Storage consists of three centralized files: sectoral list of measurement equipment (SI); metrological data sheets; and data about test units and equipment. The data system is realized on a YeS computer with YeS 7920 and YeS 7906 terminals. The programming is compatible with the YeS 6.1 operating system (or more advanced versions) and uses the Spektr relational network data base management system. One or more terminals can operate in dialogue mode and searches can be made for required instrumentation configurations. Hard copy is available from alphanumeric printers. B.G.

N86-26256# Joint Publications Research Service, Arlington, Va.

MAN-MACHINE PROBLEMS IN DEVELOPMENT AND OPERATION OF COMPUTER-AIDED DESIGN SYSTEMS Abstract Only

B. S. Irugov and N. V. Paradizov *In its* USSR Report: Cybernetics, Computers and Automation Technology (JPRS-UCC-85-010) 31 Dec. 1985 p 24 Transl. into ENGLISH from Pribory, Sredstva Avtomatizatsii i Sistemy Upravleniya: Opty Khudozhestvennogo Konstruirovaniya v Priborostroyenii (Moscow, USSR), no. 15, 8 Jan. 1985 p 19-26 (For primary document see N86-26253 16-82)

Avail: NTIS HC A03/MF A01

Human factors engineering of computer aided design systems consists in ascertaining and classifying the man machine interactions, efficiently distributing the functions among the machine and human components, and coordinating their joint operations. The ergonomic aspects of the construction of a computer aided design system for printed circuit boards are discussed. The operations performed by human operators are ranked according to the

importance of the work station components in terms of the volume of information handled, the duration of each operation, and the influence of fatigue (visual, aural, physical, and psychological) on the operator. A typical illustration (consisting of a plotter, design specifications engineer, display console graphics data input unit, printed cirsuit board designer, and a control computr) is presented. B.G.

N86-26257# Joint Publications Research Service, Arlington, Va.
SEMANTIC MODULES IN MACHINE TRANSLATION SYSTEM Abstract Only
L. N. Belyaeva, L. V.. Matorina, R. G. Piotrovskij, and T. V. Yashchenko *In its* USSR Report: Cybernetics, Computers and Automation Technology (JPRS-UCC-85-010) 31 Dec. 1985 p 25 Transl. into ENGLISH from Nauchno-tekhnicheskaya Informatsiya Seriya 2 Informatsionnyye Protsessy i Sistemy (Moscow, USSR), no. 7, Jul. 1985 p 29-34 (For primary document see N86-26253 16-82)
Avail: NTIS HC A03/MF A01

A semiotic analysis was made of the matrix frame and thesaurus network translation method for word combinations in technical text. In the matrix frame analysis method, the combination rules for lexical units that form terminological word combinations are taken from the dictionary entry for each word form and put in standard frame patterns, where one of the frames represents patterns that reflect different semantic and syntactic construction schemes for the input word combination employed in the relevant area of knowledge. The thesaurus network procedure combines the valence method, which is based on consideration of the permitted combinability of semantic features of word forms comprising a terminological word combination, and analysis of the word combinations with the help of a branch thesaurus. The matrix frame approach is advantageous in that the nomenclature of all possible elements in relationships between them are assigned, which makes it possible to recognize the value of the components of the terminological word combination fairly rapidly. The thesaurus network approach does not require a priori explicit explication of all possible elements of the word combinations and connections between them. B.G.

N86-26258# Joint Publications Research Service, Arlington, Va.
IMPROVING OPERATING EFFICIENCY OF INFORMATION SYSTEMS BY EMPLOYING RELATIONAL DATA BASE MODEL Abstract Only
F. G. Kasumov, A. M. Imranov, and B. K. Melikova *In its* USSR Report: Cybernetics, Computers and Automation Technology (JPRS-UCC-85-010) 31 Dec. 1985 p 26 Transl. into ENGLISH from Narodnoye Khozyaystvo Azerbaydzhana (Baku, USSR), no. 6, Jun. 1985 p 42-47 (For primary document see N86-26253 16-82)
Avail: NTIS HC A03/MF A01

A relational approach to structuring the AFIPS (computerized information retrieval system) data base is described, although it is never made clear if it was applied in practice. The AFIPS is a subsystem of the Azerbaydzhan Republic Scientific Technical Information System and is made up of four subsystems to support economic management and planning entities as well as specialists within the republic by acquiring, storing, searching, outputting information, and providing on-line user access to the data base from interactive terminals. The use of relational structuring of the data base makes it possible to avoid opening and closing subfiles frequently, to access the required data block rapidly, to avoid rigid connections between the identifying key and the address of a record in a block, and to locate the blocks of the same subfile arbitrarily in a peripheral memory. Author

N86-26001# Stanford Univ., Calif. Dept. of Compute Science.
DISCOVERY, CONFIRMATION, AND INCORPORATION OF CAUSAL RELATIONSHIPS FROM A LARGE TIME-ORIENTED CLINICAL DATA BASE: THE RX PROJECT
Robert L. Blum *In its* Data Base Management 31 Jul. 1985 p 13-55 refs (For primary document see N86-25999 16-60)
Avail: NTIS HC A14/MF A01 CSCL 09/2

N86-26003# California Univ., Berkeley. Lawrence Berkeley Lab.
SCIENTIFIC INFORMATION = DATA + META-DATA
John L. McCarthy *In* Stanford Univ. Data Base Management 31 Jul. 1985 p 79-124 refs (For primary document see N86-25999 16-60)
Avail: NTIS HC A14/MF A01 CSCL 09/2

N86-26004# San Jose State Univ., Calif.
PUT THE INFORMATION IN THE DATABASE, NOT THE PROGRAM
James L. Dolby *In* Stanford Univ. Data Base Management 31 Jul. 1985 p 125-139 refs (For primary document see N86-25999 16-60)
Avail: NTIS HC A14/MF A01 CSCL 09/2

N86-26005# Pacific Northwest Lab., Richland, Wash.
MANAGING THE DATA ANALYSIS PROGRESS
W. L. Nicholson, P. J. Cowley, D. B. Carr, and M. A. Whiting *In* Stanford Univ. Data Base Management 31 Jul. 1985 p 141-166 refs (For primary document see N86-25999 16-60)
Avail: NTIS HC A14/MF A01 CSCL 09/2

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N86-26259# Committee on Commerce, Science, and Transportation (U. S. Senate).
NOMINATIONS: OCTOBER
Washington GPO 1985 137 p Hearings before the Committee on Commerce, Science, and Trasportation, 99th Congr., 1st Sess., 3 Oct., 9 Oct., 17 Oct., 22 Oct., 23 Oct., and 24 Oct. 1985
(S-Hrg-99-561; GPO-56-017) Avail: Committee on Commerce, Science, and Transpotation

Biographical sketches, prehearing and posthearing questions, and prepared statements of candidates for the following positions are presented: deputy administrator for NASA; Marine Mammal Commission members; commissioner and chairman for the Federal Maritime Commission; administrator for the Maritime Administration; National Transportation Safety Board members; Communications Satellite Corporation board of directors; and commissioner for the Consumer Product Safety Commission. For individual titles, see N86-26260 through N86-26260.

N86-26260# Committee on Commerce, Science, and Transportation (U. S. Senate).
WILLIAM R. GRAHAM, TO BE DEPUTY ADMINISTRATOR, NASA
(For primary document see N86-26259 16-84)
Avail: Committee on Commerce, Science, and Transpotation

The biographical sketch of William Robert Graham, Jr., nominee for deputy administrator for NASA, was presented. International cooperation, commercialization, and the role of the Department of Defense in relationship to the Space Station; fifth Orbiter; Shuttle operations; space science and applications; prioritization of flight opportunities; and commercialization of space were discussed. B.G.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N86-26261*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
OVERVIEW OF THE 1986 FREE-PISTON STIRLING SP-100 ACTIVITIES AT THE NASA LEWIS RESEARCH CENTER Final Report
Jack G. Slaby 1986 20 p refs Prepared for presentation at the 21st Intersociety Energy Conversion Engineering Conference, San Diego, Calif., 25-29 Aug. 1986; sponsored by ACS, SAE, ANS, ASME, IEEE, AIAA, and AIChE
(Contract DE-AI05-82OR-1005)
(NASA-TM-87305; E-3028; DOE/NASA/1005-9; NAS 1.15:87305) Avail: NTIS HC A02/MF A01 CSCL 10B

An overview of the NASA Lewis Research Center SP-100 free-piston Stirling engine activities is presented. These activities include a free-piston Stirling space-power technology feasibility demonstration project as part of the SP-100 program being conducted in support of the Department of Defense (DOD), Department of Energy (DOE), and NASA. The space-power Stirling advanced technology effort, under SP-100, addresses the status of the 25 kWe Space Power Demonstrator Engine (SPDE) including test results. Future space-power projections are presented along with a description of a study that will investigate the feasibility of scaling a single-cylinder free-piston Stirling space-power module to the 150 kW power range. Design parameters and conceptual design features will be presented for a 25 kWe, single-cylinder free-piston Stirling space-power converter. A description of a hydrodynamic gas bearing concept is presented whereby the displacer of a 1 kWe free-piston Stirling engine is modified to demonstrate the bearing concept. And finally the goals of a conceptual design for a 25 kWe Solar Advanced Stirling Conversion System capable of delivering electric power to an electric utility grid are discussed. Author

N86-26262# Oak Ridge National Lab., Tenn.
USE OF BROKER ORGANIZATIONS IN TECHNOLOGY TRANSFER AND RESEARCH UTILIZATION FOR THE BUILDINGS INDUSTRY
E. D. Copenhaver Dec. 1985 133 p
(Contract DE-AC05-84OR-21400)
(DE86-004674; ORNL/TM-9581) Avail: NTIS HC A07/MF A01

Several broker organizations are already an active part of the technology transfer and research utilization activities of DOE's Building Systems Division. These interactions often take the form of service on broker organization or DOE task forces and review committees, joint sponsorship of meetings and workshops, subcontracts for research and/or information dissemination to brokers, publication of documents, code and standards setting activities, and congressional testimony. Recommendations for additional research on technology transfer utilizing brokers are also outlined. DOE

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N86-26263*# Dartmouth Coll., Hanover, N.H. Dept. of Physics and Astronomy.
A SEARCH FOR METAL LINES IN THE SPECTRA OF DA WHITE DWARFS Semiannual Report, 1 Oct. 1984 - 31 Mar. 1985
Gary A. Wegner 5 Jun. 1986 22 p refs
(Grant NAG5-287)
(NASA-CR-176825; NAS 1.26:176825) Avail: NTIS HC A02/MF A01 CSCL 03A

A theoretical analysis was carried out in order to interpret the ultraviolet spectra of DB white dwarfs obtained earlier with the International Ultraviolet Explorer (IUE) satellite. Here the results of the IUE ultraviolet spectroscopy combined with visual data and model atmospheres of DB white dwarfs are reported. In particular, a search for spectra lines due to the element carbon using the ultraviolet was made. In no case is there a positive detection of carbon and from these data, and upper limits for carbon by number relative to helium are derived in the range of C: He $<$ 10 to the minus 5 power to 10 to the minus 7 power for the 16 DB stars with ultraviolet spectra in the temperature range 11400 K $<$ T sub EFF $<$ less than 2300 K. The low carbon abundances found in the atmospheres of the DB stars agree well with the hypothesis that the atmospheric carbon observed in the cooler DQ members of the helium-rich white dwarf sequence is produced by a convective dredging mechanism. Author

N86-26264# National Weather Service, Salt Lake City, Utah.
SUNRISE/SUNSET AND MOONRISE/MOONSET, REVISED
G. R. Lussky Jan. 1986 86 p
(PB86-157229; NOAA-NWS-WRCP-51-Rev) Avail: NTIS HC A04/MF A01 CSCL 03A

The two AFOS programs, called SUN and MOON, allow the user to produce annual, monthly, or daily tables of sunrise/sunset or moonrise/moonset for most latitude-longitude locations around the globe. As a result, it is possible to have sunrise/sunset or moonrise/moonset times for those locations at which these data are not readily available. The programs were developed to allow the forecasters to have sun and moon data for any number of stations around their area of interest. This should make it quite easy to rapidly disseminate accurate information to those public interests requesting such data. These are the two main benefits of the programs - speed and accuracy of information. GRA

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N86-26265# State Univ. of New York, Stony Brook.
RESEARCH IN NUCLEAR ASTROPHYSICS: STELLAR COLLAPSE AND SUPERNOVAE Progress Report
A. Burrows, J. M. Lattimer, and A. Yahil 1986 30 p
(Contract DE-AC02-80ER-10719)
(DE86-004411; DOE/ER-10719/3) Avail: NTIS HC A03/MF A01

The interaction between nuclear theory and some outstanding problems in astrophysics is examined. The chief emphasis of our program is on stellar collapse, supernovae and neutron star formation. Central to these topics is the parallel development of both an equation of state of hot, dense matter and a novel type of hydrodynamical code. The LLPR compressible liquid drop model is the basis of the former. We are refining it to include both curvature corrections to the surface energy nuclear force parameters which are in better agreement with recently determined experimental quantities. Our study of the equation of state has the added bonus that our results can be used to analyze intermediate energy heavy ion collisions, which, in turn, may illuminate the nucleon-nucleon force. The hydrodynamical code

includes a fast, but accurate, approximation to the complete LLPR equation of state. We model not only the stellar collapse leading up to a supernova, but also the quasi-static deleptonization and cooling stages of the nascent neutron star. Our detailed studies of the role of neutrinos in stellar collapse and neutron star formation concentrate on their detectability and signatures. These studies are intended to shed light on the early history of the universe, in which both nuclear and elementary particle physics play a crucial role. DOE

N86-26266*# Virginia Univ., Charlottesville. Dept. of Astronomy.
HIGHLY IONIZED ATOMS IN COOLING GAS
Richard J. Edgar and Roger A. Chevalier 1986 16 p refs
(Grant NAGw-764)
(NASA-CR-176819; NAS 1.26:176819) Avail: NTIS HC A02/MF A01 CSCL 03B

The ionization of low density gas cooling from a high temperature was calculated. The evolution during the cooling is assumed to be isochoric, isobaric, or a combination of these cases. The calculations are used to predict the column densities and ultraviolet line luminosities of highly ionized atoms in cooling gas. In a model for cooling of a hot galactic corona, it is shown that the observed value of N(N V) can be produced in the cooling gas, while the predicted value of N(Si IV) falls short of the observed value by a factor of about 5. The same model predicts fluxes of ultraviolet emission lines that are a factor of 10 lower than the claimed detections of Feldman, Brune, and Henry. Predictions are made for ultraviolet lines in cooling flows in early-type galaxies and clusters of galaxies. It is shown that the column densities of interest vary over a fairly narrow range, while the emission line luminosities are simply proportional to the mass inflow rate. Author

N86-26267# Chalmers Univ. of Technology, Goeteborg (Sweden). Raaoe Rymdobservatorium.
LONG-TERM STUDY OF SiO (v=1, J=2-1) MASER EMISSION FROM EVOLVED STARS AND ORION A
L. A. Nyman and H. Olofsson 1985 25 p refs
(PB86-143070; Rept-85/33) Avail: NTIS HC A03/MF A01 CSCL 03B

The SiO (v=1, J=2-1) maser emission was observed over a period of more than four years towards eight late-type stars and Orion A. This was done in order to study the general characteristics of the maser emission and, in particular, investigate any possible correlations with the optical variations of the central star. The implications of the results on the pump mechanism, the location of the masers, and the kinematics of the inner part of the circumstellar envelope will be discussed. Long-term monitoring of SiO masers has been performed previously by others. The observations described cover a longer time interval and are except for the first case, more frequently sampled in time. Also observed H2O maser emission towards the same stars. The shapes of the SiO and H2O profiles are compared, and the relative location of the masers in the circumstellar envelope is discussed. GRA

N86-26268*# National Geophysical Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA NUMBER 494, OCTOBER 1985. PART 2: (COMPREHENSIVE REPORTS). DATA FOR APRIL 1985, JANUARY-JUNE 1984 AND MISCELLANEA
H. E. Coffey Oct. 1985 170 p
(Contract NASA Order-W-15519; Grant NSF ATM-83-18491)
(NASA-CR-176676; NAS 1.26:176676; PB86-143252;
SGD-494-PT-2) Avail: NTIS HC A08/MF A01 CSCL 03B

Contents include: detailed index for 1985; data for April 1985 (Meudon carte synoptique, solar radio bursts at fixed frequencies, solar X-ray radiation form GOES satellite, mass ejections from the sun, active prominences and filaments); data for January to June 1984 (solar flares January 1984, solar flares February 1984, solar flares March I984, solar flares April 1984, solar flares May 1984, solar flares June 1984, and number of flates August 1966 to June 1984); and miscellaneous data (interplanetary solar wind July 1984 to March 1985, errata solar X-rays event list January 1985). GRA

N86-26269*# National Geophysical Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA NUMBER 494, OCTOBER 1985. PART 1: (PROMPT REPORTS). DATA FOR SEPTEMBER 1985, AUGUST 1985 AND LATE DATA
H. E. Coffey, ed. Oct. 1985 88 p
(NASA Order W-15519; Grant NSF ATM-83-18491)
(NASA-CR-176833; NAS 1.26:176833; PB86-143245;
SGD-494-Pt-1) Avail: NTIS HC A05/MF A01 CSCL 03B

Data for August and September 1985 on IUWDS alert periods (advance and worldwide), solar activity indices, solar flares, solar radio emission, Stanford mean solar magnetic fields, solar active regions, sudden ionospheric disturbances, solar radio spectral observations, cosmic ray measurements, geomagnetic indices. radio propagation indices, inferred interplanetary magnetic field polarity, preliminary solar proton event list, and calcium plage are presented. B.G.

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

No abstracts in this category.

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N86-26270*# Atmospheric and Environmental Research, Inc., Cambridge, Mass.
AN INVESTIGATION OF THE ENERGY BALANCE OF SOLAR ACTIVE REGIONS USING THE ACRIM IRRADIANCE DATA Final Report
Larry D. Petro Feb. 1986 82 p refs
(Contract NASw-4062)
(NASA-CR-176788; NAS 1.26:176788) Avail: NTIS HC A05/MF A01 CSCL 03B

The detection of a significant correlation between the solar irradiance, corrected for flux deficit due to sunspots, and both the 205 nm flux and a photometric facular index were examined. A detailed analysis supports facular emission as the more likely source of correlation with the corrected radiance, rather then the error in sunspot correction. A computer program which simulates two dimensional convection in a compressible, stratified medium was investigated. Subroutines to calculate ionization and other thermodynamic variables were also completed. B.G.

N86-26271# Air Force Geophysics Lab., Hanscom AFB, Mass.
AUTOMATED SYSTEM FOR RESOLVING THE POSITION OF SOLAR RADIO BURSTS Interim Scientific Report
David N. Gaunt 19 Aug. 1985 16 p refs
(AD-A164425; AFGL-TR-85-0179; AFGL-IP-330) Avail: NTIS HC A02/MF A01 CSCL 03/1

A swept freqency interferometer system such as the one in operation at Sagamore Hill observatory, described in AFGL Tech report 76-0194 1976, contains in its output data, precise information which can determine, in a plane resolution, the position of a radio source on the solar disk within 1.3 min arc. This information is the frequency separation between the interference fringes within the spectrum observed. A system which could, automatically, convert this information to degrees and minutes of arc is described. GRA

N86-26272# Air Force Geophysics Lab., Hanscom AFB, Mass. Space Physics Div.
PEAK-FLUX-DENSITY SPECTRA OF LARGE SOLAR RADIO BURSTS AND PROTON EMISSION FROM FLARES Scientific Interim Report, Jul. 1981 - Jul. 1985
E. W. Cliver, L. F. McNamara, and L. C. Gentile 19 Aug. 1985 61 p refs
(AF Proj. 2311)
(AD-A164458; AFGL-TR-85-0180; ERP-924) Avail: NTIS HC A04/MF A01 CSCL 03/1

We have reexamined the relationship between U-shaped peak-flux-density microwave spectra and solar proton events for approx 200 large (Sp(> or = 2GHz) > or = 800 solar flux units (sfu) microwave burst (1965 - 1979). The radio spectra fell into two basic classes: (1) U-shaped with two maxima (> or = 800 sfu) in the range from 200 MHz to > or = 10 GHz (59 percent of all events), and (2) cutoff spectra with a maximum > or = 800 sfu at f > or = 2 GHz and Sp (200 MHz) < 100 sfu (18 percent). Nine percent of the events had intermediate spectra with a maximum > or = 800 sfu at f > or = 2 GHz and 100 sfu < or = Sp (200 MHz) < 800 sfu. We were unable to classify 15 percent of the events because of incomplete data. The associations of the three classes of spectra with Type II (and/or Type IV) meter wavelength bursts and > 10 MeV proton events of any size (> or = 0.01 pr per sq cm per sec per sr) are as follows: U-shaped Type II/IV (90 percent of large microwave bursts with U-shaped spectra are associated with Type II/IV events), protons (77 percent); intermediate Type II/IV (78 percent), protons (73 percent); and cutoff Type II/IV (22 percent), protons (33 percent). These statistics affirm various lines of evidence linking coronal shock waves and interplanetary proton events. They also suggest that the meter wavelength branch of the U-shaped spectrum may be attributable to second phase (vs flash phase) accelerated electrons. GRA

N86-26273# California Univ., Los Angeles.
RESEARCH IN SOLAR-TERRESTRIAL PHYSICS Final Technical Report, 1 Oct. 1981 - 30 Nov. 1983
25 Jan. 1986 15 p refs
(Contract N00014-82-K-0031)
(AD-A164460) Avail: NTIS HC A02/MF A01 CSCL 03/1

A report on research in solar-terrestrial physics includes the following: Ultra Low Frequency Waves; Magnetic Pulsations; Predicting Geomagnetic Activity Using Solar Wind Data; Auroral Electrojets; Partial Ring Current; The Symmetric Ring Current; The Role of Driven and Unloading Processes in Substorms; A Study of the Near-Earth Plasma Sheet; and Methods of Time Series Data Base Management. GRA

N86-26274# California Univ., Los Angeles.
RESEARCH IN SOLAR-TERRESTRIAL PHYSICS Final Technical Report, 1 Dec. 1983 - 31 Mar. 1985
R. L. McPherron 25 Jan. 1986 35 p refs
(Contract N00014-84-C-0158)
(AD-A164504) Avail: NTIS HC A03/MF A01 CSCL 03/1

The primary goal of the research is to understand the physical phenomena which transfer energy from the solar wind to the magnetosphere, which then transport energy within the magnetosphere, and finally which lead to its dissipation in the ionosphere and its return to the solar wind. The current research projects include three distinct topics: solar wind-magnetosphere coupling, triggering of substorm expansion onsets, and generation of ultra low frequency waves. The investigation of solar wind-magnetosphere coupling is concerned with establishing how the rate of energy transfer into the magnetosphere depends on bulk parameters of the solar wind. The second topic, triggering of substorm onsets, is concerned with understanding the mechanism whereby solar wind energy stored in the tail lobes is released into the inner magnetoshere. In the model favored, this release is caused by reconnection of lobe magnetic field at a near-earth neutral line. The present research is concerned with demonstrating that this process is highly localized, transient, and at times involves multiple neutral lines. The third topic is the study of ultra low frequency waves (ULF) (1 to 1000 mHz). GRA

93 SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N86-26275# California Univ., Berkeley. Lawrence Berkeley Lab.
SPECTRUM OF THE COSMIC BACKGROUND RADIATION: EARLY AND RECENT MEASUREMENTS FROM THE WHITE MOUNTAIN RESEARCH STATION
G. F. Smoot Sep. 1985 12 p Presented at the Conference on Research Work at the U.C. Research Station at White Mountain, Bishop, Calif., 30 Aug. 1985
(Contract DE-AC03-76SF-00098)
(DE86-002888; LBL-20344; CONF-8508148-1) Avail: NTIS HC A02/MF A01

The White Mountain Research Station has provided a support facility at a high, dry, radio-quiet site for measurements that have established the blackbody character of the cosmic microwave background radiation. This finding has confirmed the interpretation of the radiation as a relic of the primeval fireball and helped to establish the hot Big Bang theory as the standard cosmological model. DOE

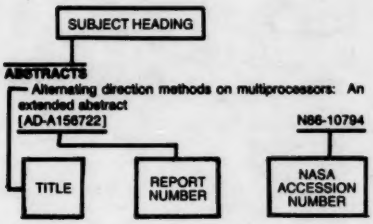
N86-25585# Joint Publications Research Service, Arlington, Va.
HIGH-ENERGY DEVICES, OPTICS AND PHOTOGRAPHY
K. Borodio *In its* USSR Report: Engineering and Equipment (JPRS-UEQ-86-001) 24 Jan. 1986 p 76 Transl. into ENGLISH from Sotsilaisticheskaya Industriya (Moscow, USSR), 21 Nov. 1985 p 4 (For primary document see N86-25556 16-31)
Avail: NTIS HC A06/MF A01

99 GENERAL

N86-26276*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LANGLEY AEROSPACE TEST HIGHLIGHTS, 1985
May 1986 100 p
(NASA-TM-87703; NAS 1.15:87703) Avail: NTIS HC A05/MF A01 CSCL 05A

The role of the Langley Research Center is to perform basic and applied research necessary for the advancement of aeronautics and space flight, to generate new and advanced concepts for the accomplishment of related national goals, and to provide research advice, technological support, and assistance to other NASA installations, other government agencies, and industry. Significant tests which were performed during calendar year 1985 in Langley test facilities, are highlighted. Both the broad range of the research and technology activities at the Langley Research Center and the contributions of this work toward maintaining United States leadership in aeronautics and space research, are illustrated. Other highlights of Langley research and technology for 1985 are described in Research and Technology-1985 Annual Report of the Langley Research Center. Author

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7053).

A

ABIOGENESIS
Exploratory studies on deep Earth sources of methane: Hg as a diagnostic and prospecting tool
[PB86-156148] N86-25871

ABSORPTION SPECTRA
Influence of laser radiation on induced absorption spectra of pure quartz glass optical fibers N86-26136

ABSORPTION SPECTROSCOPY
The spectroscopy and reaction kinetics of coordinated unsaturated metal carbonyls
[AD-A164003] N86-25436

ABSORPTIVITY
Measurement of the acoustic pressure everywhere over a modeled continental slope
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Bomb crater repair techniques for permanent airfields, series 2 and 3 tests
[AD-A164394] N86-25386
Metallization qualification for VLSI (TRACE test)
[AD-A163032] N86-25813

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Multichannel ring commutator for high-current accelerators N86-25606

ACCELEROMETERS
Astrogeodetic-inertial methods for vertical deflection determination
[AD-A164304] N86-25336

ACCIDENT PREVENTION
DFW (Dallas-Ft. Worth) microburst on August 2, 1985
[NASA-CR-176794] N86-25956

ACCIDENTS
Probabilistic risk assessment course documentation. Volume 7: Environmental transport and consequence analysis
[TI86-002575] N86-26088

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Design of pneumohydraulic accumulators with high-compressibility energy storing medium N86-25609

ACCURACY
Increments in aerofoil maximum lift coefficient due to deployment of various high-lift devices
[ESDU-85033] N86-25325
Characterization and calibration of four high energy laser calorimeters
[AD-A163507] N86-25758

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Picosecond photoconductivity in trans-polyacetylene
[AD-A164373] N86-25440
Bis(Pentafluorosulfur)Diacetylene polymer therefrom and preparations thereof
[AD-D012124] N86-25487

ACHIEVEMENT
Proceedings of the Item Response Theory and Computerized Adaptive Testing Conference — 3
[AD-A163040] N86-25990

ACID RAIN
China report: Science and technology
[JPRS-CST-86-011] N86-25547
Acid rain, other factors studied in destruction of pine forests N86-25551
Forecasting transportation activity and emissions for the National Acid Precipitation Assessment Program
[DE85-018352] N86-25888
Comparison of a multilayer regional-scale acid rain assessment model (MLRAPT) with a single-layer assessment model, RAPT
[DE86-004862] N86-25889
Acidic deposition: Effects on agricultural crops
[DE86-004943] N86-25890

ACOUSTIC ATTENUATION
High-speed high-voltage amplifier N86-25605
Measurement of the acoustic pressure everywhere over a modeled continental slope
[AD-A164126] N86-26164

ACOUSTIC EMISSION
Universal instrument for acoustic inspection N86-25629
Five-channel instrument for acoustic flaw detection by method of acoustic emission N86-25630
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Atlantic Oceanographic and Meteorological Laboratory Fiscal Year 1985 report
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Monograph on prospective developments in oceanology
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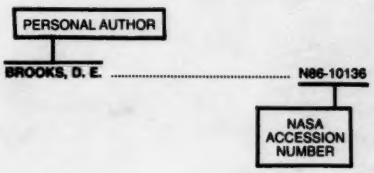

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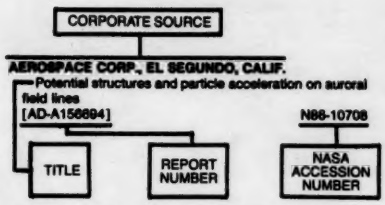

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, WASHINGTON, D.C.
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AMERIND PUBLISHING CO. PVT. LTD., NEW DELHI (INDIA).
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Information systems in ADOT (Arizona Department ofTransportation): Analysis of intra-function flow, decision support needs, existing systems utility and user attitudes, volume 1
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ARMY COLD REGIONS RESEARCH AND ENGINEERING LAB., HANOVER, N. H.
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ARMY COLD REGIONS TEST CENTER, APO SEATTLE, WASH. 98733.
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ARMY COMMUNICATIONS-ELECTRONICS COMMAND, FORT MONMOUTH, N.J.
Proceedings of the 34th Wire and Cable Symposium held at Cherry Hill, New Jersey on 19-21 November 1985
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ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
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DEPARTMENT OF ENERGY, WASHINGTON, D. C.
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FIAT RESEARCH CENTER, ORBASSANO, TURIN (ITALY).
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MORGAN STATE UNIV., BALTIMORE, MD.
Mossbauer investigation of intermetallic hydrides
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MORTON THIOKOL, BRIGHAM CITY, UTAH.
Minuteman stage 3 operational surveillance program 7-year testing bondline aging study
[AD-A164288] N86-25503
MOUND LAB., MIAMISBURG, OHIO.
Analysis of hydrogen getter mixtures
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MSNW, INC., SAN MARCOS, CALIF.
Plasma joining of metal matrix composites
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N

NAGOYA UNIV. (JAPAN).
Transport theory of axisymmetric toroidal plasma with RF wave source in the Pfirsch-Schrueter regime
[IPPJ-765] N86-26211
NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, HOUSTON, TEX.
Emergent techniques for assessment of visual performance
[PB86-144755] N86-25988
NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Remote sensing of the Earth from Space: A program in crisis
[NASA-CR-176796] N86-25873
Report on artificially structured materials
[PB86-144102] N86-26232
Research briefings for the Office of Science and Technology Policy, the National Science Foundation and selected federal departments and agencies, 1985
[PB86-148582] N86-26240
NAS (National Academy of Sciences) exchanges with the academies of sciences of the USSR and Eastern Europe
[PB86-141827] N86-26252
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D.C.
Aeronautical Engineering: A Continuing Bibliography with Indexes (supplement 194)
[NASA-SP-7037(194)] N86-25322
Aeronautical Engineering: A Continuing Bibliography with Indexes (supplement 200)
[NASA-SP-7037(200)] N86-25323
An overview of European space transportation systems
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Dicarboxylic acid anhydride condensation with compounds containing active methylene groups. 4: Some 4-nitrophthalic anhydride condensation reactions
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Manufacture of sintered silicon nitrides
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Method for producing tetraphenoxide-n-anilioxy cyclo phosphazotriene
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Influence of the temperature of electrode material on its disintegration under the action of an arc discharge in hydrogen
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Propagation of detonations in hydrazine vapor
[NASA-TM-77922] N86-25727
Proceedings of a Workshop on Applications of Tethers in Space: Executive Summary
[NASA-CP-2422] N86-25794
Present state of knowledge of the upper atmosphere: An assessment report; processes that control ozone and other climatically important trace gases
[NASA-RP-1162] N86-25911
Formation of the central uplift in meteoric craters
[NASA-TM-88427] N86-25913
Monograph on prospective developments in oceanology
[NASA-TM-87983] N86-25959
Quasi-generalized variables
[NASA-TM-88429] N86-26070
Measurement of partial pressures in vacuum technology and vacuum physics
[NASA-TM-88438] N86-26094
Significant NASA inventions available for licensing in foreign countries
[NASA-SP-7038(08)] N86-26243
The library system of the DFVLR: Present status, planned reorganization, user possibilities
[NASA-TM-77674] N86-26246
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
Laminate comprising fibers embedded in cured amine terminated bis-imide
[NASA-CASE-ARC-11421-3] N86-25416
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. DRYDEN (HUGH L.) FLIGHT RESEARCH CENTER, EDWARDS, CALIF.
Digital Electronic Engine Control (DEEC) Flight Evaluation in an F-15 Airplane
[NASA-CP-2298] N86-25342
Digital electronic engine control F-15 overview
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Digital electronic engine control history
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F-15 digital electronic engine control system description
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Augmentor transient capability of an F100 engine equipped with a digital electronic engine control
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.

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NASTRAN interfacing modules within the Integrated Analysis Capability (IAC) Program N86-25829
Optical multiple sample vacuum integrating sphere
[NASA-CASE-GSC-12849-1] N86-26190

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.

Mass spectrometric gas composition measurements associated with jet interaction tests in a high-enthalpy wind tunnel
[NASA-TM-87642] N86-25429
Process for crosslinking and extending conjugated diene-containing polymers
[NASA-CASE-LAR-13452-1] N86-25477
Semi-2-interpenetrating networks of high temperature systems
[NASA-CASE-LAR-13450-1] N86-25478
The construction and use of divergence free vector expansions for incompressible fluid flow calculations
[NASA-CR-178100] N86-25728
Synchronously deployable truss structure
[NASA-CASE-LAR-13117-1] N86-25789
Latching mechanism for deployable/re-stowable columns useful in satellite construction
[NASA-CASE-LAR-13169-1] N86-25791
Description of data on the Nimbus 7 LIMS map archive tape: Temperature and geopotential height
[NASA-TP-2553] N86-25924
Cumulative reports and publications through December 31, 1985
[NASA-CR-178088] N86-25994
Stencils and problem partitionings: Their influence on the performance of multiple processor systems
[NASA-CR-178102] N86-25995
A fourth order accurate finite difference scheme for the computation of elastic waves
[NASA-CR-178089] N86-26068
Preconditioned methods for solving the incompressible and low speed compressible equations
[NASA-CR-178086] N86-26089
Experimental study of the effects of installation on singleand counter-rotation propeller noise
[NASA-TP-2541] N86-26162
Langley aerospace test highlights, 1985
[NASA-TM-87703] N86-26276

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.

Lower power dc arcjet operations with hydrogen hydrogen/nitrogen propellant mixtures
[NASA-TM-87279] N86-25407
Structural integrity and durability for Space Shuttle main engine and future reusable space propulsion systems
[NASA-TM-87280] N86-25408
Power electronics for a 1-kilowatt arc jet thruster
[NASA-TM-87340] N86-25409
Fracture characteristics of angleplied laminates fabricated from overaged graphite/epoxy prepreg
[NASA-TM-87266] N86-25417
Ignition delay times of benzene and toluene with oxygen in argon mixtures
[NASA-TM-87312] N86-25431
Tensile behavior of Fe-40Al alloys with B and Zr additions
[NASA-TM-87290] N86-25453
Sputtered cadmium oxide as a surface pretreatment for graphite solid lubricant films
[NASA-TM-87300] N86-25473
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[NASA-TM-87284] N86-25475
Tribolgy of selected ceramics at temperatures to 900 deg C
[NASA-TM-87267] N86-25476
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[NASA-TM-88763] N86-25650
Thermomechanical design criteria for ceramic-coated surfaces
[NASA-TM-87328] N86-25726
Variable friction secondary seal for face seals
[NASA-CASE-LEW-14170-1] N86-25790
Generation of spiral bevel gears with zero kinematical errors and computer aided tooth contact analysis
[NASA-TM-87273] N86-25793
Concepts for interrelating ultrasnic attenuation, microstrucutre and fracture toughness in polycrystalline solids
[NASA-TM-87339] N86-25812
Cyclic creep analysis from elastic finite-element solutions
[NASA-TM-87213] N86-25822
Oxygen recombination in individual pressure vessel nickel-hydrogen batteries
[NASA-CASE-LEW-13822-1] N86-25874
Overview of the 1986 free-piston Stirling SP-100 activities at the NASA Lewis Research Center
[NASA-TM-87305] N86-26261

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.

Fluid flow meter for measuring the rate of fluid flow in a conduit
[NASA-CASE-MFS-28030-1] N86-25752
Compendium of meteorology scientific issues of 1950 still outstanding
[NASA-RP-1167] N86-25900

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. NATIONAL SPACE TECHNOLOGY LABS., BAY SAINT LOUIS, MISS.

Timber Resources Inventory and Monitoring Joint Research Project
[NASA-TM-88754] N86-25863

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.

Solar heated oil shale pyrolysis process
[NASA-CASE-NPO-16392-1] N86-25428
Discharge cell for optogalvanic spectroscopy having orthogonal relationship between the probe laser and discharge axis
[NASA-CASE-NPO-16271-1] N86-25753

NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).

AGARD Cooperative Test Progamme on titanium alloy engine disc material N86-25369
TURBISTAN: A standard load sequence for aircraft engine discs N86-25380
Contribution of turbine blade service failures to a damage tolerance approach N86-25382

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

Possible estimation methodologies for electromagnetic field distributions in complex environments
[PB86-167327] N86-25686
Finline diode six-port: Fundamentals and design information
[PB86-166725] N86-25718
Site attenuation
[PB86-169083] N86-25719
Development of near-field test procedures for communication satellite antennas, phase 1, part 1
[PB86-164357] N86-25720

NATIONAL BUREAU OF STANDARDS, GAITHERSBURG, MD.

Forced smolder propagation and the transition to flaming in cellulosic insulation
[PB86-166659] N86-25445
X-ray optics and microanalysis. Transactions of the International Conferency (8th) on X-Ray Optics and Microanalysis held at Moscow-Kiev on July 9-16, 1974
[PB86-155173] N86-25446
Literature review of the chemical nature and toxicity of the decomposition products of polyethylenes
[PB86-163409] N86-25447
Metallurgy technical activities, 1985
[PB86-165032] N86-25469
Diffusion and structure of metals
[PB86-156742] N86-25470
Protective coatings on metals, volume 6
[PB86-155249] N86-25496
National Conference on Weights and Measures (70th), 1985
[PB86-150232] N86-25520
Thermometer calibration: A model for state calibration laboratories
[NBS-MONO-174] N86-25756
Report on the NBS-DOE (National Bureau of Standards-Department of Energy) May 1984 Workshop on Thermal Metering
[PB86-155488] N86-25772
Diffusion processes in solid-phase welding of materials
[PB86-155025] N86-25801
A three-dimensional mesoscale model for the simulation of clouds, precipitation and airflow
[AD-A164468] N86-25933
Journal of Research of the National Bureau of Standards, volume 90, number 5, September-October 1985
[PB86-166782] N86-26098
Anguiar distribution of high energy electrons following radiation
[PB86-141934] N86-26179
NBS LATTICE: A program to analyze lattice relationships, version of summer, 1985
[PB86-166774] N86-26233
Thermodynamics of high temperature materials
[AD-A164253] N86-26234
Technical activities 1983, Center for Basic Standards
[PB86-140043] N86-26239
Guide on selecting ADP (Automatic Data Processing)backup processing alternatives
[PB86-154820] N86-26241

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.

Thermodynamics and heat transfer in fire fighting
[PB86-155181] N86-25524
Topology of local atomic environments: Implications for magnetism and superconductivity
[DE86-002933] N86-26229

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.

Primary photochemical processes of acrolein
[PB86-145802] N86-25894
Role of the oceans in the atmospheric cycle of carbonyl sulfide
[PB86-144078] N86-25918
UNIX word processing at HAO (for use with the 4.2 BSD version and -me macro package)
[PB86-155801] N86-26053

NATIONAL CENTER FOR HEALTH SERVICES RESEARCH AND HEALTH CARE TECHNOLOGY ASSESSMENT, ROCKVILLE, MD.

Cardiokymography
[PB86-133790] N86-25987

NATIOANL CENTER FOR TOXICOLOGICAL RESEARCH, JEFFERSON, ARK.

High-field NMR (Nuclear Magnetic Resonance) for structural analysis of complex polycyclic aromatic hydrocarbons
[PB86-150653] N86-25448

NATIONAL ENVIRONMENTAL SATELLITE SERVICE, WASHINGTON, D. C.

Plan for space station polar-orbiting platform
[AD-A164405] N86-25403

NATIONAL GEOPHYSICAL DATA CENTER, BOULDER, COLO.

Earthquake and tsunami data services and publications
[PB86-156254] N86-25919
Solar-geophysical data number 496, December 1985. Part 1: (Prompt reports). Data for November 1985, October 1985 and late data
[NASA-CR-176795] N86-25922
Solar-geophysical data number 496, December 1985. Part 2: (Comprehensive reports). Data for June 1985, January-May 1985 and miscellanea
[NASA-CR-176793] N86-25923
Solar-geophysical data number 494, October 1985, Part 2: (Comprehensive reports). Data for April 1985, January-June 1984 and miscellanea
[NASA-CR-176676] N86-26268
Solar-geophysical data number 494, October 1985. Part 1: (Prompt reports). Data for September 1985, August 1985 and late data
[NASA-CR-176833] N86-26269

NATIONAL MATERIALS ADVISORY BOARD, WASHINGTON, D. C.

Basic and strategic metals industries: Threats and opportunities
[PB86-154499] N86-25471

NATIONAL OCEAN SERVICE, ANCHORAGE, ALASKA.

Outer Continental Shelf Environmental Assessment Program. Final reports of principal investigators, volume 34
[PB86-150109] N86-25920

NATIONAL OCEAN SERVICE, ROCKVILLE, MD.

Tide tables 1986, high and low water predictions, central and western Pacific Ocean and Indian Ocean
[PB86-148434] N86-25967
Directory of selected research supported by NOAA's (National Oceanic and Atmospheric Administration's) Ocean Assessments Division
[PB86-150216] N86-25969

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.

Statistical model to estimate the refractivity turbulence structure constant carbon sup 2 sub n in the free atmosphere
[PB86-148749] N86-25921
Feasibility study on the use of firefinder radar for wind profiling
[PB86-158417] N86-25946

Program for Regional Observing and Forecasting Services (PROFS), fiscal year 1985
[PB86-158110] N86-25947
Optical System Model 4 for space-averaged wind and C sub n sup 2 measurements
[PB86-144086] N86-25955

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, MIAMI, FLA.
Hurrican Research Division, Atlantic Oceanographic and Meteorological Laboratory fiscal year 1985 programs: Fiscal year 1986 projections
[PB86-158755] N86-25945
Atlantic Oceanographic and Meteorological Laboratory Fiscal Year 1985 report
[PB86-150091] N86-25953
Computer code for calculating acoustic ray paths with application to the Straits of Florida
[PB86-156391] N86-25968

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ROCKVILLE, MD.
Remote sensing of the Earth from Space: A program in crisis
[NASA-CR-176796] N86-25873
National hurricane operations plan, May 1985
[PB86-148384] N86-25936

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SEATTLE, WASH.
Sea ice dynamics and regional meteorology for the Arctic polynya experiment (APEX)-Bering Sea 1985
[PB86-148038] N86-25939

NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA (ONTARIO).
Practical experience with damage tolerance based life extention of turbine engine components N86-25383

NATIONAL SEVERE STORMS FORECAST CENTER, KANSAS CITY, MO.
Severe local storm warning verification: 1984
[PB86-148244] N86-25938

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, BOULDER, COLO.
Technical basis for the Geostationary Satellite Orbit Analysis Program (GSOAP), version 2
[PB86-151750] N86-25391
Millimeter-wave urban and suburban propagation measurements using narrow and wide bandwidth channel probes
[PB86-147741] N86-25683
ISDN (Integrated Services Digital Network): Numbering, addressing and interworking
[PB86-143617] N86-25685

NATIONAL TRANSPORTATION SAFETY BOARD, WASHINGTON, D. C.
Aircraft accident report: Air Canada flight 797, McDonnell Douglas DC-9-32, C-FTLU, Greater Cincinnati International Airport, Covington, Kentucky, June 2, 1983
[PB86-910402] N86-25332
Aircraft accident/incident summary reports: Concord, California, July 14, 1984; Atlanta, Georgia, September 24, 1984; Jasper, Alabama, December 16, 1984; Avalon, California, January 30, 1984; Charlottesville, Virginia, February 17, 1984; Kansas City, Kansas, January 9, 1985
[PB86-910410] N86-25333

NATIONAL WEATHER SERVICE, FORT WORTH, TEX.
Minimum temperature forecast aid for radiational cooling situations in the lower Rio Grande Valley of Texas
[PB86-154242] N86-25948

NATIONAL WEATHER SERVICE, GARDEN CITY, N.Y.
Comparison among various thermodynamic parameters for the prediction of convective activity, part 2
[PB86-142353] N86-25942

NATIONAL WEATHER SERVICE, HONOLULU, HAWAII.
Tropical cyclones, 1983, central North Pacific
[PB86-158185] N86-25944

NATIONAL WEATHER SERVICE, KANSAS CITY, MO.
Statistical analysis of SHEF (Standard Hydrometeorological Exchange Format) coding errors
[PB86-145141] N86-25940
Climatological summary programs F6, CLIMAT, SUMMARY, GETCS
[PB86-143948] N86-25941

NATIONAL WEATHER SERVICE, SALT LAKE CITY, UTAH.
NWR (National Weather Service) voice synthesis project, phase 1
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Sunrise/sunset and moonrise/moonset, revised
[PB86-157229] N86-26264

NATIONAL WEATHER SERVICE, SILVER SPRING, MD.
AFOS (Automation of Field Operations and Services) - era forecast verification, October 1985
[PB86-148319] N86-25937
AFOS (Automation of Field Operations and Services) era forecast verification
[PB86-152386] N86-25950
AFOS (Automation of Field Operations and Services) terminal forecast decoding
[PB86-152337] N86-25951
AFOS (Automation of Field Operations and Services) terminal forecast decoding
[PB86-147360] N86-25954

NATIONAL WEATHER SERVICE, WASHINGTON, D.C.
Monthly and seasonal weather outlook for mid-February to mid-March 1986, volume 40, number 4, February 14, 1986
[PB86-162229] N86-25943
Monthly and seasonal weather outlook for February 1986, volume 40, number 3, January 30, 1986
[PB86-155660] N86-25949

NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA.
Statistical analysis of spin pit failure data to predict inservice B.1 lives of gas turbine disks N86-25377

NAVAL AIR PROPULSION TEST CENTER, TRENTON, N.J.
Engine cyclic durability by analysis and testing: Highlights of the spring 1984 PEP Meeting N86-25382

NAVAL OCEAN RESEARCH AND DEVELOPMENT ACTIVITY, BAY ST. LOUIS, MISS.
Coastal Secchi depth atlas
[AD-A164420] N86-25963

NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.
Stress concentration investigations using NASTRAN N86-25832
Flutter analysis of low aspect ratio wings N86-25838

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
An analysis of the performance of the fans of a wind tunnel at the Naval Postgraduate School
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The radiation effects of high energy electrons upon thermionic integrated circuits
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[AD-A164495] N86-25934
Variation of friction velocity across the surface marginal ice zone in the East Greenland Sea
[AD-A164497] N86-25964
Hydrographic data from the OPTOMA program, OPTOMA18, 31 October and 2 November 1985
[AD-A163429] N86-25966
The OZDRAW User's Manual AD-A163633 NPS52-86-005 HC A05/MF A01
[AD-A163633] N86-26024
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NAVAL RESEARCH LAB., WASHINGTON, D. C.
The effect of LPC (Linear Predictive Coding) processing on the recognition of unfamiliar speakers
[AD-A164461] N86-25665
Narrowband integrated voice data system based on the 2400-b/s LPC (Linear Predictive Coder)
[AD-A163158] N86-25671
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An examination of models of relaxation in complex systems. 1. Continuous time random walk (CTRW) models
[AD-A164462] N86-26081

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, ANNAPOLIS, MD.
An evaluation of J-R curve testing using three point bend specimens
[AD-A164509] N86-26082

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.
Experiences with NASTRAN in a multidisciplinary optimization environment N86-25831
Calculating far-field radiated sound pressure levels from NASTRAN output N86-25840
A general low frequency acoustic radiation capability for NASTRAN N86-25841

NAVAL UNDERWATER SYSTEMS CENTER, NEW LONDON, CONN.
A finite element surface impedance representation for steady-state problems N86-25842

NAVAL WEAPONS CENTER, CHINA LAKE, CALIF.
Characterization of aluminum nitride/aluminum oxide reactively sputtered antireflection coatings
[AD-A164494] N86-25778

NEVADA UNIV., RENO.
The nature and origin of mineral coatings on volcanic rocks of the Black Mountain, Stonewall Mountain and Kane Springs Wash volcanic centers in southern Nevada
[NASA-CR-176805] N86-25912

NEW MEXICO STATE UNIV., LAS CRUCES.
SHARP (Stabilized High Altitude Research Platform)
[AD-A164459] N86-25404

NEW MEXICO UNIV., ALBUQUERQUE.
Operational characteristics of a high voltage dense plasma focus
[AD-A164298] N86-26216

NEW YORK STATE DEPT. OF TRANSPORTATION, ALBANY.
Lateral Restraint of non-composite beams
[PB86-143781] N86-25861
NEW YORK UNIV., NEW YORK.
Computational techniques for shock wave diffraction problems
[AD-A163776] N86-25738
NIPPON UNIVAC KAISHA LTD. (JAPAN).
Enhancements to Sperry/NASTRAN N86-25824
NORTH CAROLINA STATE UNIV., RALEIGH.
A study into the mechanism(s) for the electroplastic effect in metals and its application to metalworking
[AD-A163785] N86-25457
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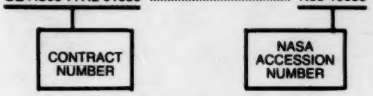

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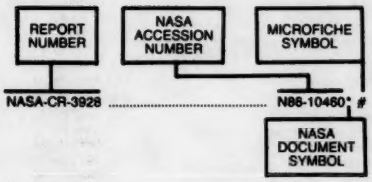

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NOAA-NWS-WRCP-51-REV ..... N86-26264 #

NOAA-TM-ERL-AL-10 ..... N86-25921 #

NOAA-TM-ERL-AOML-62 ..... N86-25968 #

NOAA-TM-ERL-PMEL-64 ..... N86-25939 #

NOAA-TM-ERL-WPL-52-REV ..... N86-25955 #
NOAA-TM-ERL-WPL-128 ..... N86-25946 #

NOAA-TM-NWS-CR-78 ..... N86-25940 #

NOAA-TM-NWS-ER-69 ..... N86-25942 #

NOAA-TM-NWS-NSSFC-10 ..... N86-25938 #

NOAA-TM-NWS-SR-115 ..... N86-25948 #

NOAA-TM-NWS-WR-192 ..... N86-25684 #

NOAA-TM-NWSTM-PR-29 ..... N86-25944 #

NOAA/SR/NOS/OMA-1 ..... N86-25969 #

NORDA-83 ..... N86-25983 #

NOSC-CR-312 ..... N86-25702 #

NPS 68-86-001 ..... N86-25966 #

NPS-52-86-005 ..... N86-26024 #

NPS53-86-0001 ..... N86-26083 #
NPS54-85-08 ..... N86-26237 #
NPS67-85-012 ..... N86-25741 #
NPS67-85-012CR ..... N86-25759 #

NRL-MR-5713 ..... N86-25776 #
NRL-MR-5719 ..... N86-26061 #

NRL-8926 ..... N86-25865 #
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NSF/ENF-85043 ..... N86-25810 #

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NSF/PRA-85023 ..... N86-25687 #

NTIA-85-184 ..... N86-25683 #
NTIA-85/182 ..... N86-25685 #
NTIA-86/183 ..... N86-25391 #

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NTSB-AAR-86-02 ..... N86-25332 #

NUREG/CR-4350/7 ..... N86-26088 #

NWC-TP-6651 ..... N86-25778 #

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ORC-85-14 ..... N86-26034 #

ORNL-6191 ..... N86-26065 #
ORNL-6242 ..... N86-26054 #

ORNL/CDIC-11 ..... N86-26245 #

ORNL/CSD-129 ..... N86-26051 #

ORNL/CSD/TM-232 ..... N86-25681 #

ORNL/M-82 ..... N86-25890 #

ORNL/TM-9581 ..... N86-26262 #
ORNL/TM-9691 ..... N86-25466 #
ORNL/TM-9704 ..... N86-26213 #
ORNL/TM-9706 ..... N86-25891 #
ORNL/TM-9782 ..... N86-26020 #

OSURF-716042 ..... N86-25867 #
OSURF-763057/714467 ..... N86-25358 #

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PB88-910402 ..... N86-25332 #
PB88-910410 ..... N86-25333 #

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PFC/RR-85-23 ..... N86-26212 #

PNL-SA-13028 ..... N86-25889 #
PNL-SA-13233 ..... N86-25725 #

PNL-5710 ..... N86-25811 #

PR-35 ..... N86-26194 #

R-028-85 ..... N86-25992 #
R-3355-NSF ..... N86-25687 #

RADC-TR-85-175 ..... N86-25813 #
RADC-TR-85-177 ..... N86-26201 #
RADC-TR-85-184 ..... N86-25699 #

REB85-004 ..... N86-26217 #

REPT-1 ..... N86-25613 #
REPT-2 ..... N86-25386 #
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REPT-5230-APP-A/W ..... N86-25512 #
REPT-001120-1 ..... N86-25385 #

ROB-03-85 ..... N86-26072 #

RR-123 ..... N86-25861 #

RSRE-MEMO-3866 ..... N86-25652 #

RT/PAS/85/21 ..... N86-25722

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S-HRG-99-561 ..... N86-26259 #

SAIC-86/1025 ..... N86-25914 #

SAND-84-2598 ..... N86-25848 #
SAND-85-0373 ..... N86-25651 #
SAND-85-0379 ..... N86-25724 #
SAND-85-0813 ..... N86-25326 #
SAND-85-1199 ..... N86-26192 #
SAND-85-1301C ..... N86-25857 #
SAND-85-1595 ..... N86-26066 #
SAND-85-2095C ..... N86-25846 #
SAND-85-2339C ..... N86-26178 #
SAND-85-8240 ..... N86-26021 #

SAND85-1495/7 ..... N86-26088 #

SAR-1 ..... N86-25689* #

SD-838-1108 ..... N86-25404 #

SERI/PR-252-2598 ..... N86-25755 #

SERI/STR-211-2810 ..... N86-25480 #
SERI/STR-211-2811 ..... N86-25876 #

SGD-494-PT-1 ..... N86-26269* #
SGD-494-PT-2 ..... N86-26268* #
SGD-496-PT-1 ..... N86-25922* #
SGD-496-PT-2 ..... N86-25923* #

SGI-R-85-120 ..... N86-26165 #

SLAC-AP-47 ..... N86-26170 #

SLAC-PUB-3802 ..... N86-26236 #

SMRP-RP-217 ..... N86-25956* #

SPIRE-FR-60057 ..... N86-26223 #

SR-1 ..... N86-26016 #
SR-1 ..... N86-26165 #
SR-85-29 ..... N86-25930 #

STNR-F1 ..... N86-25774 #

SYRU/DECE/TR85/6 ..... N86-26095 #

TFD-85-1 ..... N86-25746 #

TI86-002575 ..... N86-26088 #

TPR-5 ..... N86-25717 #

TR-D-84-ARO ..... N86-26079 #

TR-2 ..... N86-25440 #
TR-2 ..... N86-25852 #
TR-2 ..... N86-26095 #
TR-3 ..... N86-25486 #
TR-3 ..... N86-26176 #
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TR-7 ..... N86-25460 #
TR-8 ..... N86-26174 #
TR-01-85-ONR ..... N86-26072 #
TR-15 ..... N86-25461 #
TR-16 ..... N86-25462 #
TR-17-REV ..... N86-26008 #
TR-18 ..... N86-25458 #
TR-38 ..... N86-26220 #
TR-62 ..... N86-26071 #
TR-1047-02 ..... N86-26043 #

TRW-41849-G-159-025 ..... N86-26018* #

TT-76-52021-VOL-6 ..... N86-25496 #
TT-79-52022 ..... N86-25470 #
TT-80-52014 ..... N86-25801 #
TT-81-52155 ..... N86-25446 #
TT-81-52193 ..... N86-25524 #

TTU-IDR-75D ..... N86-25491 #

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UCID-20080-REV-1 ..... N86-25680 #
UCID-20297-85-4 ..... N86-26022 #
UCID-20519 ..... N86-25925 #
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UCID-20598 ..... N86-25400 #
UCID-20609 ..... N86-26191 #

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UCRL-92955 ..... N86-25479 #
UCRL-93115 ..... N86-26029 #
UCRL-93531 ..... N86-26063 #
UCRL-93564 ..... N86-26052 #
UCRL-93596 ..... N86-25754 #

UCT/DEECS/TR-86-1 ..... N86-26041 #
UCT/DEECS/TR-86-2 ..... N86-25666 #

UDOT-MR-85-1 ..... N86-25523 #

UILU-ENG-86-2203 ..... N86-26047 #
UILU-ENG-86-2547 ..... N86-25650* #

UNC/ORSA/TR-85/8 ..... N86-26089 #

UNIDO/IS.542 ..... N86-25519 #

US-PATENT CLASS-358-89 ..... N86-26207 #
US-PATENT CLASS-427-255.6 ..... N86-25487 #

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US-PATENT-CLASS-8-DIG.9 ..... N86-25428*
US-PATENT-CLASS-42-101 ..... N86-25874*
US-PATENT-CLASS-48-197-R N86-25428*
US-PATENT-CLASS-52 648 ..... N86-25789*
US-PATENT-CLASS-52-110 ..... N86-25791*
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US-PATENT-4,507,659 ..... N86-25679 #
US-PATENT-4,510,607 ..... N86-25784 #
US-PATENT-4,513,329 ..... N86-25768 #
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US-PATENT-4,559,613 ..... N86-25714 #
US-PATENT-4,559,626 ..... N86-26017 #
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